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Secretariat for Strengthening Democracy (SSD)

Department of Electoral Cooperation and Observation (DECO)

Electoral Integrity Analysis

General Elections in the Plurinational State of Bolivia

October 20, 2019

FINAL REPORT

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LIST OF FINDINGS

To facilitate review of this audit's findings, the following list sorts by type the actions and omissions that took place during the electoral process that had a definitive impact on the certainty, credibility, and integrity of the results of the vote of October 20, 2019.

DELIBERATE ACTIONS THAT SOUGHT TO MANIPULATE THE RESULTS OF THE ELECTION
These are willful acts intended to affect the electoral process as officially planned.

- Intentional and arbitrary freezing, with no technical basis, of the Preliminary Results Transmission System (TREP) when 83.76% of the tally sheets had been verified and disseminated, out of 89.34% of tally sheets that had been transmitted and were in the TREP system. The TSE deliberately hid from citizens 5.58% of the tally sheets that were already in the TREP system but not published.

- Addition of servers not planned for in the technology infrastructure (servers named BO1[1] and BO20[2]) to which the flow of TREP information was intentionally diverted. To re-direct the flow to the BO20 server, the target IP address to which the 350 machines used in the SERECI were directed was changed. The servers were used to transcribe and verify the tally sheets, and for the flow of other related data from the TREP. The BO1 server was active even during the time the preliminary results system was "turned off."

- Untruths were told regarding the actual configuration of the hidden BO1 server (implemented on a NEOTEC Amazon network and detected by the audit company). In addition to being a gateway between the user and the server, as stated by NEOTEC, it also handled other web requests—as can be viewed in its logs—and stores elections databases and applications. The databases were accessible during the OAS audit, something that was confirmed with the audit company hired by the TSE (in special consultation prior to wrapping up this report). The existence of the databases on a hidden server described (only after being detected) as a gateway is extremely grave and merits a special investigation during a subsequent judicial process.

- The audit company's controls were deliberately evaded and traffic was re-directed to a network outside the domain, administration, control, and monitoring of TSE staff.

- This technological scheme, set up deliberately to be parallel and unmonitored, facilitated an environment enabling data manipulation, forgery of tally sheets, or other ploys, facilitated by the volatility of the digital evidence.

- The supplier of the application had direct access to the official count servers remotely, through a virtual private network (VPN), because it refused to work in the TSE offices in San Jorge, where the National Directorate on Information and Communications Technology (DNTIC) auditors and staff were

[1] First information re-direct destination, until 7:40 p.m. of October 20, 2019.
[2] Second information re-direct destination once the TREP recommenced on October 21, 2019.

located. This individual worked remotely and without any supervision, and reported the changes made by email.

- At the request of the members of the TSE and an individual described as their advisor,[3] a server was set up on an Amazon network outside the TREP and count systems on a Linux AMI virtual machine. It should be noted that this individual was not a TSE staff member or an employee of the audit company or supplier company. It was confirmed that user ec2-user (also escalated to root privileges) accessed the machine on October 21, 2019, and while the TREP was in full swing in its second stage (after the freeze).

- False information was provided on the use of the Linux AMI virtual machine, and a deliberate attempt was made to conceal the existence of server BO20 from the audit team.

- The TSE had a main server (BO2), a backup (BO2S), and a publication server (BO3). The description of how the BO3 server was used was a deliberate untruth, as it was not the one used for publication: At the time of the audit, it had fewer tally sheets than what had been published. Inconsistencies were found between the BO2 and BO3 databases.

- It was confirmed (in the presence of the SERECI technician, the head of the company in Bolivia, and the head of the DNTIC) that NEOTEC staff had accessed the servers and/or databases despite the explicit request by OAS auditors that once the audit was begun, absolutely **no one** access the servers.

- Irregularities were detected in the completion of the tally sheets and the count, which affected their integrity. In an exercise aimed at analysing potential falsification or manipulation, a sample of 4,692 tally sheets was reviewed. The analysis found 226 cases in which two or more tally sheets from a single polling station were filled out by the same person, indicating an intentional and systematic attempt to manipulate the results of the election and violate the law establishing the duties of the sworn polling table workers. The tally sheets came from 86 polling stations in 47 different municipalities. Their total valid votes added up to 38,001, of which 91% (34,718) were awarded to the Movimiento al Socialismo (MAS).

- Despite the sensitivity of the matter, an unknown number of tally sheets and more than 13,100 voter rolls (*listas índice*) were burned, making it impossible to compare them with the information provided in the ballot count and tally sheets.

[3] With the exception of Member Costas, who, according to a note, was not present.

GRAVE IRREGULARITIES

These are actions that, while not clear if intended to manipulate aspects of the election, certainly caused serious harm to the integrity of the electoral process.

- The metadata of the images of the TREP was not preserved in order to determine their authenticity and the identification of the source from which these files were acquired.

- The hash value was not logged in the report generated by the software freeze, and later, changes were made to it in the middle of the electoral process. The changes recorded included modifications involving the processing of external tally sheets even though they were already in the system. The external tally sheets are the ones used both in the TREP and in the final count.

- Images were transferred from the TREP's primary server (BO2) to the applications and publishing server and included in the official count. That is, images from the TREP, consisting of photographs of tally sheets, were added directly from the TREP to the official count. This categorically rules out the claim that the TREP and the official count are two completely independent processes.

- There were images of external tally sheets incorporated through a functionality called "Delayed Tally Sheets." This falls outside the anticipated circuit for sending images of tally sheets. The individual in charge of that functionality entered both the image of the tally sheet and the information from it. The application also enabled the direct addition of tally sheets without transmission from a mobile phone. In this case, they were added by a SERECI official. It is important to emphasize that the TREP system has the ability to erase images.

- Traces of databases and of the NEOTEC application were found on perimeter services that should not have had databases or versions of the application used for the process.

- The head of the company providing the software used the *root user*[4] to access the operating system in the middle of the night (on his own initiative), subsequent to the official sealing of the system: that is, after it was thought that the systems were ready and that nobody could access them.

- The NEOTEC representative changed the official count software more than once in the middle of the process. The company recompiled it (at which time it loses integrity with regard to what was saved during the freeze) and put it in production environment during the electoral process.

- At least 1,575 tally sheets from the TREP (an environment whose network was violated and manipulated) were added directly to the official count.

- During the official count process, data was changed in the database directly through SQL commands (which allows data to be changed without using the application) to fix problems with a calculation algorithm. Through this access alone, which took place 20 minutes after direct access to the databases to "reverse the annulment of the tally sheets," the data from 41 tables was changed directly in the database.

[4] The root user has all the privileges and permissions to perform actions on a Linux operating system.

- The final count database could be accessed directly, without going through the application.
- Failure to adequately preserve evidence about the election.
- Deficient chain of custody did not guarantee that the elections materials were not manipulated and/or replaced.
- Original (not filled out) tally sheets from overseas voting were discovered in TSE offices. It is anomalous for original material that should have been discarded due to errors or defects not to have been destroyed. This is an indication that procedures for destroying sensitive material that was defective and/or extra (in good condition) were not followed.

ERRORS
Mistakes or negligence without indication of intentionality but that could have facilitated actions that did violate the electoral process

- In the TREP system, the "Approve Tally Sheets" function offered the option of approving tally sheets even in the event of conflicting values between Pass 1 and Pass 2. This function made it possible to continue processing tally sheets in spite of differences.
- Authentication for use of the computer system's software was weak and allowed a user to take control as administrator. It was found that a single code could be used to open multiple sessions; that a new tab could be opened in the navigator before closing the previous one; and that, when someone working with the system stepped away, even if the application had been closed, their user could be accessed without authentication (including for roles allowing tally sheet validation).
- The TED computers in La Paz were seen to have test data (for example, tally sheets) mixed with tally sheets from the day of the election. Failure to remove this test data contaminates the production environment.
- Interruption of the publication of the official count due to denial of service attacks against the server publishing the official results (October 24 and 25).
- Inclusion of individuals disqualified from voting on voter rolls for checking polling station tally sheets. That is, the official count database contained both the list of qualified voters and the list of disqualified voters.
- Little or no coordination between the TEDs and the police force to protect sensitive materials.
- At least 37 tally sheets from overseas voting were found with inconsistencies as to the number of citizens who voted. That is, the number of votes on the tally sheets was different than the total number of voters on the voter rolls.[5]

[5] Information was obtained indicating a greater number of tally sheets with the same situation, but in the absence of all the backup images, they were excluded from the analysis. Annex 9 includes the tally sheets and qualified voter rolls from these 37 tables. The inside pages of the lists, copies of which are in the possession of the auditing team, are not published in this report to protect the personal information of qualified voters, as they include full name, date of birth, identification document number, photograph, signature, and fingerprint.

CLUES

Statistical analysis and comparison of information that provided a group of auditors with data possibly indicating abnormal behavior and the instances where electoral documentation should be analyzed in greater depth.

- An analysis of the use of the space for comments in the tally sheets of the official count found that 12,925 tally sheets (37%) included comments providing some clarification or noting a situation that took place during the vote or vote counting. Fifty-six percent of the tally sheets that were entered directly into the official count and were never published through the TREP had comments. Analysis of the type of comments found in the 12,925 tally sheets indicates that 18% corresponded to changes/corrections to the number of votes recorded for the presidential election. The audit also found that of these 12,925 tally sheets, 846 were entered only in the final count (final 4.4%), of which, 328 (39%) referred to changes in the number of votes for president.

- The statistical analysis concluded that the first-round victory of Evo Morales was statistically improbable and the result of a massive and inexplicable increase in the number of votes for MAS in the final 5% of the votes counted. Without this increase, although the MAS would have obtained the majority of votes, it would not have had the 10% difference needed to avoid the second round. This increase came with noticeable breaks in the trendlines of votes for the ruling party and for Comunidad Ciudadana (CC), at both the national and departmental levels. The size of the breaks is extremely unusual and calls into question the credibility of the process.

EXECUTIVE SUMMARY

The manipulations and irregularities found do not allow for certainty as to candidate Morales' margin of victory over candidate Mesa. On the contrary, based on the overwhelming evidence found, what can be concluded is that a series of willful actions were taken to alter the results expressed at the polls.

First, on the night of the election, the electoral tribunal deliberately interrupted the transmission of the results. All the analysis of the technical team led to the conclusion that the halting of the TREP system was not an accident or a decision based on technical grounds. It was simply an arbitrary decision whose purpose included the manipulation of the IT infrastructure.

When the system recommenced operating the following day, a hidden server appeared that was undeclared and controlled neither by the audit company nor by the technical staff of the electoral body. The remaining TREP information, amounting to more than 1400 tally sheets, was processed through this server. The second server did not appear in any report until the OAS audit discovered it through expert analysis.

Technical officials of the electoral body sent a letter to the OAS audit acknowledging that a server had been set up on a network outside the TREP on a Linux AMI virtual machine. They also acknowledged having done so at the request of the TSE members and in coordination with an IT advisor who was not part of the Civic Registry Service (SERECI) staff; the staff of the OEP's National Information Technology Directorate (DNTIC); or the audit company's staff. The letter is attached with names redacted to protect the identities and personal information of the individuals involved; however, it has been sent to the Office of the Public Prosecutor.

The interruption of the TREP and subsequent redirecting of the data flow to an external server made the system absolutely manipulable. Effectively, the expert analysis reveals that a hidden IT infrastructure was built deliberately with the capacity to change the results of the election and erase any trace of having done so.

The official count was also affected. Although in theory, the system was independent from the system transmitting preliminary results, in practice this was not the case. The audit team confirmed that for overseas voting, the TREP images were used to perform the official count. Also, this method was used for some voting tables in the country due to the burning or loss of original tally sheets. A total of 5% of the TREP tally sheet images went directly to the count. This connection between the TREP—a clearly manipulated system—and the official count affects the latter's credibility.

The statistical analysis of the results revealed through both systems shows that the declaration of victory in the first round by then-President Evo Morales was only possible because of a massive spike of votes toward the end of the count. The audit team found a significant break in the MAS and CC voting trends from the moment the TREP count reached 95% of votes.

The final 5% of the count shows not only a different trend from the other 95% but an extremely noticeable difference from the 5% of votes that had been counted immediately prior. Also, even if one

accepts the supposition that the tables that reported late were in rural areas that favored the MAS, one would still not see such a sharp break right around an arbitrary point like the threshold of 95%.

In view of the breaks in the voting trends, the audit team proceeded to examine the tally sheets corresponding to the last 5% of the count in detail. The audit team experts found that 56% of the tally sheets that were entered directly into the official count and were never published through TREP (that is, included in the final count) had comments. This percentage is significantly higher than the average for the election (37%).

Additionally, from this same sample of tally sheets, the ones in which the MAS obtained a strikingly high percentage of the votes (above 77%) were subjected to expert analysis. Subsequent tables—that is, tables in the same polling center—were also looked at.

Of a total of 1,074 tally sheets, 59 (5.5%) were found to have grave irregularities from an expert point of view. In some cases, it was confirmed that all the tally sheets in a center had been completed by the same person.

Next, the focus of the analysis was expanded to a new sample of 3,618 tally sheets. Of those, 167 (4.6%) were identified by the experts as having irregularities. Again, it was found that different tally sheets from the same polling station had been filled out by a single individual, which would appear to violate the law establishing the duties of the sworn polling table workers and sow doubt as to the reported results. In all, 4,692 tally sheets were analyzed, of which 226 (4.8%) had the irregularities described.

The aforementioned tally sheets came from 86 polling stations in 47 different municipalities. This situation indicates a highly irregular procedure from an electoral point of view. These tables add up to 38,001 valid votes, of which the MAS political party obtained 91%, or 34,718 votes, almost the exact number of votes needed to enable Morales to avoid a second round.[6] This only takes into account the analysis of the 13.5% of the voting tables. Based on the pattern found, an analysis covering a greater percentage of the tally sheets would no doubt detect a greater number of instances of forgery, tampering, and manipulation.

The analysis conducted by the audit team found that the chain of custody for the tally sheets was extremely fragile. In several departments, the transfer of sensitive materials from the polling stations to the TED headquarters was not accompanied by security forces.

The information compiled showed, moreover, that there was no specific protocol for custody of the Official Tally (Envelope A) after it was received in the Departmental Electoral Tribunals, and that the organization of the tally sheets in the different TEDs was not standardized. The fact that some electoral records were burned illustrates the lack of protection, the absence of appropriate precautions, and poor coordination between the TEDs and the security forces.

The weakness of the chain of custody is a fundamental point. Given that a recount is not an option in Bolivia, the tally sheet is the only document available for reconstructing what happened on the day of

[6] Morales' margin of victory in the first round was approximately 40,000 votes. Without them, the difference compared to Mesa would have been less than 10%, and therefore, a second round would have been necessary.

the vote. In view of the demonstrated fragility of the chain of custody and the irregularities detected by the expert analysis, it is possible to infer that, were it possible to examine all the tally sheets, a significantly higher number of alterations and inconsistencies would be found.

Conclusions

The audit team has detected willful manipulation of the vote at two levels: At the tally sheet level, through their alteration and the forging of the signatures of the sworn polling table workers; and at the processing of results level, through the redirection of the data flow to two hidden servers not controlled by TSE staff making data manipulation and tally sheet forgery possible. To this are added grave irregularities like the failure to safeguard the tally sheets and the loss of sensitive material.

The findings detailed also reveal the bias of the electoral authority. The TSE members, who should have been protecting the legality and integrity of the process, allowed the flow of information to be diverted to external servers, destroying all trust in the electoral process.

It should be taken into account that this audit exercise has been abbreviated, both in terms of the time available and with regard to the components of the process analyzed. What happened prior to the election and the findings of the OAS Electoral Observation Mission regarding the inequality of the contest and actions of the TSE prior to the vote, are beyond the scope of this report.

Nevertheless, the findings are conclusive. The audit team cannot ignore the series of manipulations and irregularities it observed during its field work and its analysis of more than 200 complaints[7] and communications with information it received. To do so would be highly irresponsible and a failure to comply with the mandate assumed upon agreeing to conduct the audit.

The margin of victory in the first round is slight considering the amount of manipulation and tampering detected. Contained hereinafter is incontrovertible evidence of an electoral process marred by grave irregularities and the actions of a tribunal that threatened the transparency and integrity of the vote. It is on the basis of this evidence that we reiterate the impossibility of validating the results of the October election.

ELECTORAL INTEGRITY ANALYSIS

- **Background**

On October 30, the OAS General Secretariat and the Government of the Plurinational State of Bolivia signed the agreements[8] relating to the analysis of the electoral integrity of the elections. Those documents established that the Government would provide every facility needed to perform a proper audit of the official vote count in the elections of October 20, along with verification of the tally sheets, statistical aspects, the electoral process, and the chain of custody.

With this objective, the scope was defined around four essential components of the electoral process:

[7] Annex 7 – Record of complaints

[8] Annex 1 – Agreements

- Infrastructure and operation of the I.T. systems used to transmit preliminary results and the official count.
- The authenticity and reliability of the vote count records (tally sheets) and of the data input into the electoral results transmission system and the official count system.
- The plan for comprehensive custody of all electoral materials (tally sheets, ballots, voters register).
- Flows of the data on preliminary electoral results and the official count.

It was likewise agreed that the authorities would provide the OAS experts with full access to their facilities, as well as any information regarding the elections that the team considered relevant. The mandate was for the audit team to perform its field work over a period of 12 days.

At the same time, it was established that the audit would focus on Election Day (October 20) and on subsequent stages, and that, upon completing its analysis, the group of specialists would deliver a report to the Secretary General, who would remit it to the Government of Bolivia. In addition, in order to ensure both maximum seriousness and rigor, it was established that the conclusions would be binding upon the parties to the process.

On instructions from the Secretary General, a team was formed consisting of 36 specialists and auditors of 18 different nationalities, including electoral attorneys, statisticians, I.T. experts, document specialists, handwriting experts, experts in chain of custody and experts in electoral organization. The group of experts and auditors arrived in Bolivia on October 31 and began their activities on November 1, with an initial meeting with the full Supreme Electoral Tribunal, representatives of the Departmental Electoral Tribunals, and members of the technical areas of the electoral body. Points of contact where defined at this meeting, and guidelines were established for the first meeting between technical teams, which was held on November 2. On that date, the first documents and files requested of the Supreme Electoral Tribunal were received and a presentation was given on the Bolivian electoral system.

Thereafter, the auditing team began working to collect information and analyze the various components under audit. The technical personnel worked continuously, compiling, systematizing, and analyzing information through to November 9. The audit team made 12 requests for information to the[9] Plurinational Electoral Body for the different components being audited. In addition, more than 250 complaints regarding the electoral process were received, both physically and via an e-mail address established for that purpose.

One of the components of the audit involved transporting field analysts to nine of the country's departments in order to verify the conditions in place for securing electoral materials; compare physical tally sheets with the digital copies used to process results; verify the consistency of the information on the tally sheets with the voter registration lists; and determine compliance with the chain of custody. To do this, nine departmental teams were set up with two people per team. The work in this area began

[9] Annex 2 – Requests for information from the OEP

with a meeting between each group and its respective Departmental Electoral Tribunal, held in the city of La Paz.

The audit team was limited in its ability to fully carry out this component of the work plan due to the political and security conditions during those days of work on the ground. The field analysts were initially able to access the departments of La Paz, Beni, Tarija, and Pando. Work then began on possible operations for accessing the remaining departments. On November 8, a team was successfully transported to the Department of Cochabamba, and by Saturday the 9th, deployment to the remaining departments had been coordinated: Chuquisaca, Oruro, Potosí, and Santa Cruz. However, on that same day, security conditions worsened to the point that the Cochabamba team had to go that afternoon from the Departmental Electoral Tribunal offices directly to the airport. Subsequent to this withdrawal, and with the social upheaval on the rise in the country, it was not possible to deploy to the other departments. For analysis of the other components, the OAS technical experts were given the information and access needed to do their job.

Based on this work, on November 9, the preliminary results were released. Since that time, the audit team has continued to receive and process a significant volume of reports of multiple irregularities of the electoral process. The information received, consistent with the preliminary findings, is presented in detail hereinafter. This document also includes all the documentary and photographic evidence to support the comments of the audit.

The following is a breakdown of all the findings, organized as follows:

1. The transmission systems for both preliminary election results and the final count were flawed.
2. The process to fill out the tally sheets was marred by irregularities and forgeries.
3. The deficient chain of custody did not guarantee that the elections materials were not manipulated and/or replaced.
4. The tally sheets of the count are not trustworthy. However, a detailed analysis reveals that the tally sheets entered for the final 4.4% have a significant number of comments.
5. The trend of the final 5% of the count is highly improbable.

I. FINDING 1: FLAWED TRANSMISSION SYSTEMS FOR BOTH PRELIMINARY ELECTION RESULTS AND THE FINAL COUNT

For the elections held on Sunday, October 20, 2019, the Plurinational Electoral Body of Bolivia (OEP) approved the use of two systems for processing the election results recorded on the voting tally sheets: a system for transmission of preliminary elections results, called the TREP, and another system for performing the official count.

The OEP had acquired these systems for the 2016 referendum. They were developed by a company called NEOTEC, which also provided technical support services for these programs' operation.

For these elections, necessary changes were made to both programs to adapt them to this year's elections process, along with some internal adjustments to improve their operating time.

The main development calling into question the trustworthiness of the Bolivian electoral process of October 20, 2019, was the halting of the preliminary results transmission system (TREP). The OEP gave a press conference at 7:40 p.m., with 83.76% of the tally sheets verified, from 89.34% of tally sheets transmitted. The information was made public on trep.oep.org.bo.

Once the press conference was concluded, rather than continuing to process the rest of the information, the system was deliberately shut down. According to explanations offered by the OEP, the reason for this decision was a problem with the number of petitions on a server and the need to confirm its security. However, the audit team found other previously-hidden elements regarding the operation of the system. Although the body did issue a special request for a server for checking the results, there was, until that time, an undeclared server to which all the TREP information was sent.

When the TREP began operating again the next day, another hidden server appeared. The remaining TREP information was processed through this server. The second server did not appear in any report until the OAS audit discovered it through expert examination of the computer system. All the actors involved omitted mention of its existence until it was detected. Neither SERECI staff nor DNTIC staff nor external audit company Ethical Hacking had control of the external servers.

Based on the multiple findings and the analysis carried out by the audit team, the decision to halt the TREP system had absolutely no technical basis. The system's design ensured it could continue operating during power outages or even in the event of losing its primary connection to the Internet. During the night of October 20, 2019, the internet connection was cut intentionally and the provided-for backup was prevented from activating.

At the SERECI offices, which have a UPS, an electrical generator, and a redundant link, there was no event that could have justified such an outage. Therefore, on October 21, with note SERECI-DTRC-0843/2019 entitled "TREP network redundant link," the SERECI director asked the DNTIC for a report on why the SERECI computing center had been disconnected and why the redundant link had not been activated. As of the moment the document was delivered to the OAS expert auditors by the individual responsible at SERECI, no response had been given.

The decision to cut off the TREP was an arbitrary one that threatened the integrity and transparency of the electoral process. These aspects are an indication of other motivations that must be investigated, whose aim included manipulating the I.T. infrastructure by diverting the flow of TREP information to external servers.

On this point, it is important to note that the TREP system is an instrument for publication and transparency that makes it possible to quickly provide citizens with preliminary results in an expedited manner. Although in principle, it has no legal force, its inappropriate use and unsecured operation enables it to be used as a tool for controlling electoral information. Essentially, there were people who were seeing the processing of the results prior to their publication, and, due to the existence of hidden servers and grave flaws in the I.T. infrastructure, a scenario was in place allowing for the manipulation of data.

Regarding this, a fundamental aspect of the case of Bolivia must be clarified. In theory, the TREP system and the official count were independent from each other. The flow of information to the former was independent of the flow of information to the latter. In the former case, photographs taken by private individuals' cell phones were used to transmit the information from the polling centers. In the latter case, the original tally sheet was transported to be scanned and counted in the Departmental Electoral Tribunals. However, this arrangement was not fully followed, as in the case of overseas voting, the TREP images were also used for the official count. Also, this method was used for some tables in the country due to the burning or loss of original tally sheets.

The aim of these clarifications is to push back on two essential claims. The first addresses the argument downplaying the TREP manipulations on the grounds that the system "has no legal force." According to this view, what happened in the preliminary results transmission system does not matter, as in the end, the real data comes from the official count. It is the audit team's view that this argument threatens basic aspects of the integrity of the electoral process and, in this particular case, is a grave violation of the transparency, publicity, independence, impartiality, and objectivity with which an electoral institution must act. Manipulation of information on electoral results—whether preliminary or final, and regardless of whether the aim is to hide them, delay them, or change them—is an act of extreme gravity.

The second point to push back on, particularly for the case in question, is the argument that there is no connection between the TREP and the final count. As indicated, this statement is erroneous. There is a connection, in the sense that more than 5% of the TREP tally sheet images went directly to the count.

a. System for transmitting preliminary election results

The TREP is a nonbinding preliminary results system that enables the OEP to present results based on the transmission of data and images of the tally sheets from polling places. This system operated through an application installed on the cell phones of temporary staff selected and hired by the Civic Registry Service (SERECI) for these purposes, with the exception of the voting overseas, where the responsibility for operating the mobile app was assigned to an individual working the polling place.

The program enabled the operator to do an initial manual count of the votes on the cell phone, as well as take a photograph of the tally sheet, all of which was then transmitted for validation and

consolidation of preliminary data. The validation process involved comparing the electoral data entered by the operators located in polling places with the data entered by the 350 scanners located at SERECI headquarters. Should they fail to match, a third instance, called "Approval" and comprising SERECI officials, was responsible for resolving any inconsistencies that may have arisen.

All the tally sheets that successfully completed the validation process would be published immediately on a webpage set up by the OEP for such purposes. The tribunal estimated that the publication of results with this system could begin at 8:00 p.m. on October 20, 2019, with processing of approximately 80% of the tally sheets completed as of that time. These estimates were based on the time needed to count the votes at the tables and the communications infrastructure in different areas of the country.

The transmission of preliminary electoral results (TREP) system had a computing center located in the Civic Registry Service building in La Paz, spanning the basement, first floor, fourth floor, and fifth floor. This computing center had a UPS, an electrical generator, VLAN access link, and a redundant link, for a total of 350 electoral tally sheet validators.

The computers were distributed as follows:

- Basement, 150 computers;
- First floor, 100 computers;
- Fourth floor, 50 computers;
- Fifth floor, 50 computers;

The corresponding network was cabled in accordance with the distribution of the computers. Category 6 cable was used, along with 10/100/1000 Mbps-capacity switches, which were connected to the link switches installed in computer cabinets on each floor. Also, electrical cabling was run directly from the electricity distribution boards in order to balance the electrical current drawn by the computers and avoid short circuits from electrical load.

To ensure uninterrupted operations in the event of power outages, an uninterrupted power system (UPS) was installed in the CPD (fourth floor), connected to the main computer rack and the computer cabinets installed in the basement, first floor, and fifth floor of the Civic Registry Service in La Paz.

The Civic Registry Service in La Paz has a basement with an electrical generator that, in the event of power problems, turns on automatically, providing power to the communications room (CPD) on the fourth floor and to the fifth floor, first floor, and basement where power circuits for the TREP were installed.

The internet service 100 Mbps Online was acquired, provided by AXS Bolivia. It consists of a fiberoptic link between AXS and the Primary Data Center (San Jorge) of the Supreme Electoral Tribunal, with 100 Mbps internet exclusively for the TREP count. The National Information Technology and Communications Directorate (DNTIC) set up the AXS 100 Mbps internet service on the VLAN 187 intranet of the Supreme Electoral Tribunal. (DNTIC responsibility).

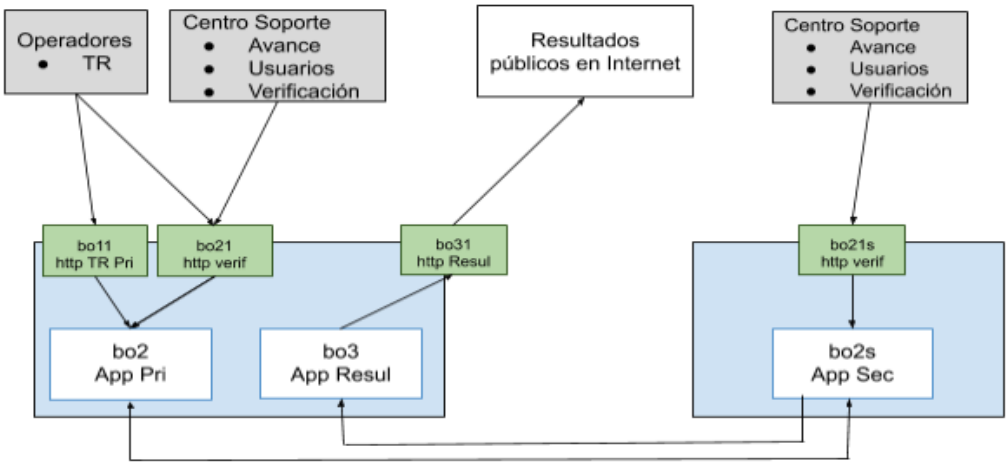
In addition, the TREP computing center had two fiberoptic connections, one active and the other passive and redundant. The first fiberoptic connection is installed from the Primary Data Center (San Jorge) and the fourth floor of the Civic Registry Service building in La Paz, the core switch.

The second fiberoptic connection (redundant) is provided by MegaLink and installed from the CPD of the Civic Registry Service building in La Paz, with internet speed of 100 Mbps. The DNTIC set up the aforementioned internet service as a redundant link between a perimeter Cisco router and the CPD's core switch on the fourth floor of the Civic Registry Service building in La Paz.

Hereinafter is the methodology used to process and validate data (TREP):

- **Description of the I.T. infrastructure originally provided**

The formal description of the TREP infrastructure (how it was supposed to work) was as follows:



This diagram is the design for controlled work by the audit company – Formal TREP network topology

The BO2 primary applications server was to receive the images of the tally sheets and election results sent from telephones. This server was to copy the tally sheets to the BO2s secondary applications server. The BO2s server was then to copy the tally sheets to the BO3 applications server for results.

It should be emphasized that the primary server (BO2), its backup (BO2s), and the publication server (BO3) should have had copies of the same information once the electoral process had concluded.

However, according to NEOTEC's description, the configuration actually used was as follows:

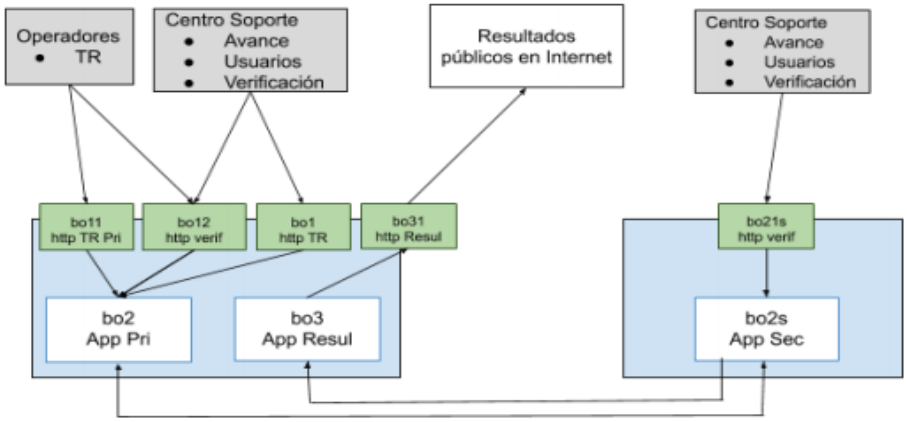


Diagram from the NEOTEC report of 10/28/2019[10]

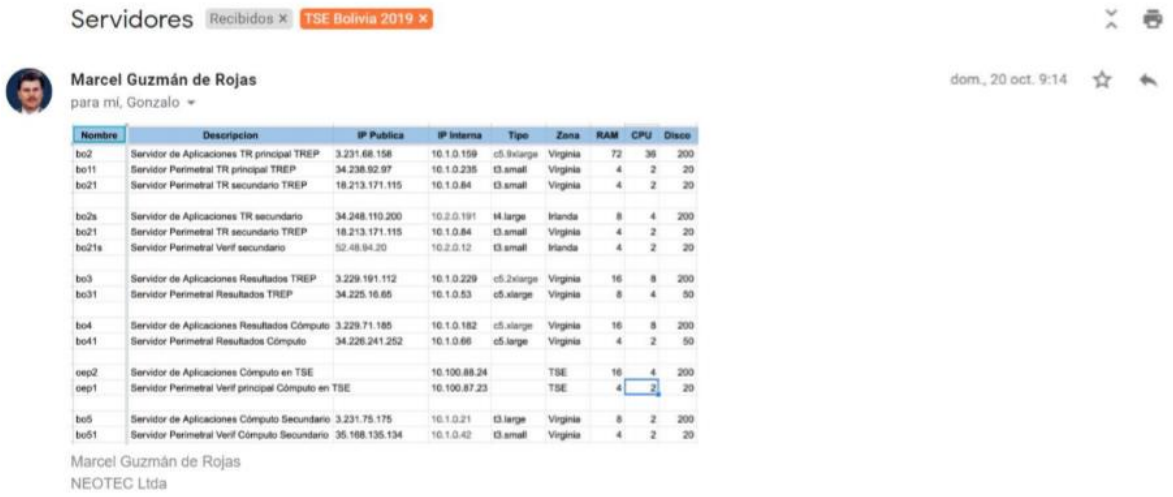
As can be noted, NEOTEC did not follow the formal configuration. Instead, it included a BO1 server, which was not included in the formal structure for the TREP, as agreed upon with the other actors involved (DNTIC, SERECI, and the audit company Ethical Hacking).

[10] Table from NEOTEC. Where it reads "bo12," it should say bo21.

– **Inclusion of BO1 server not provided for in the I.T. infrastructure**

The I.T. infrastructure used on the day of the election included a server called BO1, which was not in the plans. It was used despite the absence of the corresponding monitoring agent. According to reports by the audit company, it was provided at the request of the TSE in order to observe the results prior to their publication. This server did not have the necessary hardening and was configured incorrectly (if intended for use as a perimeter server). The introduction of a server into a production environment without control over or authorization of the change violated the chain of custody of the information.

The lack of planning for this server can be noted in communication with NEOTEC, which, on October 20, 2019, at 9:40 a.m., while the TREP process was in full swing (as the first information from overseas was being received), sent an e-mail to audit company Ethical Hacking to confirm the servers it was using. That communication lists the servers initially planned for, but not server BO1.



Servidores Recibidos × TSE Bolivia 2019 ×

Marcel Guzmán de Rojas
para mí, Gonzalo

dom., 20 oct. 9:14

Nombre	Descripcion	IP Publica	IP Interna	Tipo	Zona	RAM	CPU	Disco
bo2	Servidor de Aplicaciones TR principal TREP	3.231.68.158	10.1.0.159	c5.9xlarge	Virginia	72	36	200
bo11	Servidor Perimetral TR principal TREP	34.238.92.97	10.1.0.235	t3.small	Virginia	4	2	20
bo21	Servidor Perimetral TR secundario TREP	18.213.171.115	10.1.0.84	t3.small	Virginia	4	2	20
bo2s	Servidor de Aplicaciones TR secundario	34.248.110.200	10.2.0.191	t4.large	Irlanda	8	4	200
bo21	Servidor Perimetral TR secundario TREP	18.213.171.115	10.1.0.84	t3.small	Virginia	4	2	20
bo21s	Servidor Perimetral Verif secundario	52.48.94.20	10.2.0.12	t3.small	Irlanda	4	2	20
bo3	Servidor de Aplicaciones Resultados TREP	3.229.191.112	10.1.0.229	c5.2xlarge	Virginia	16	8	200
bo31	Servidor Perimetral Resultados TREP	34.225.16.65	10.1.0.53	c5.xlarge	Virginia	8	4	50
bo4	Servidor de Aplicaciones Resultados Cómputo	3.229.71.185	10.1.0.182	c5.xlarge	Virginia	16	8	200
bo41	Servidor Perimetral Resultados Cómputo	34.226.241.252	10.1.0.66	c5.large	Virginia	4	2	50
oep2	Servidor de Aplicaciones Cómputo en TSE		10.100.88.24		TSE	16	4	200
oep1	Servidor Perimetral Verif principal Cómputo en TSE		10.100.87.23		TSE	4	2	20
bo5	Servidor de Aplicaciones Cómputo Secundario	3.231.75.175	10.1.0.21	t3.large	Virginia	8	2	200
bo51	Servidor Perimetral Verif Cómputo Secundario	35.168.135.134	10.1.0.42	t3.small	Virginia	4	2	20

Marcel Guzmán de Rojas
NEOTEC Ltda

E-mail sent by NEOTEC to Ethical Hacking in which server BO1 is not included

After acknowledging the inclusion of server BO1, NEOTEC provided the following graphic (the checkmarks and warning signs were added by the OAS audit team):

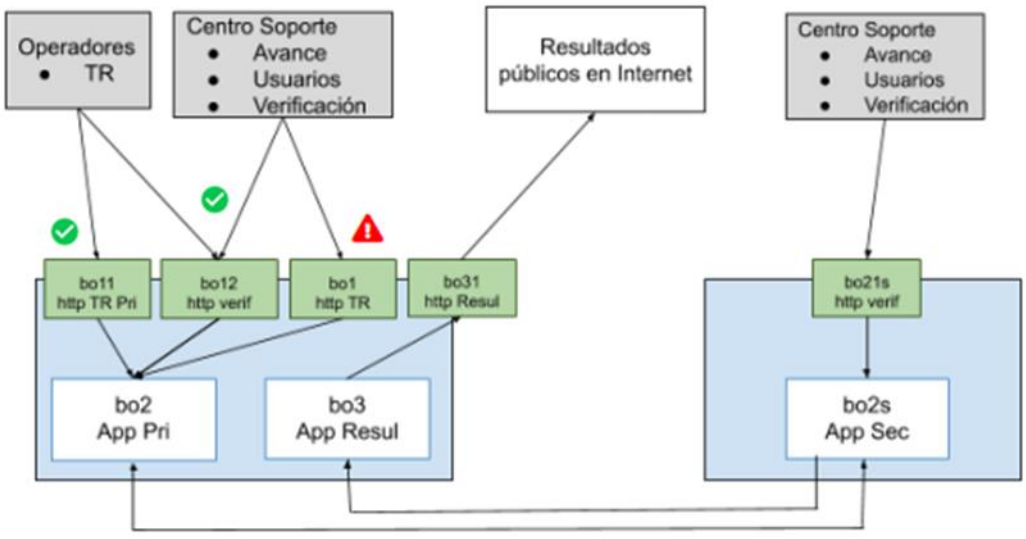


Image showing the perimeter servers according to green or red security level

The graphic shows the secure perimeter servers controlled by Ethical Hacking identified with a green checkmark, while the BO1 perimeter server is identified with a red warning sign.

The details of the servers according to role, as delivered by NEOTEC, are as follows:

bo1	Servidor perimetral (pasarela Nginx) para el servidor primario, utilizado en la etapa de preparación desde el 20 de septiembre de 2019.	⚠
bo2	Servidor principal de aplicaciones.	
bo11	Servidor perimetral principal para bo2.	✓
bo21	Servidor perimetral secundario para bo2.	✓
bo2s	Servidor secundario de aplicaciones.	
bo21s	Servidor perimetral para bo2s.	
bo3	Servidor de publicación de resultados.	
bo31	Servidor perimetral para bo3.	

This information is according to the NEOTEC report dated 10/28/2019 – (the BO21 server also appears in its report as BO12)

- **Use of BO1 server for purposes other than those described**

According to the analysis performed by OAS experts, not only was the BO1 not planned, it was not used only for the purpose described in the reports that the TSE delivered to the audit team. The OAS audit team found that it was used, from the beginning of the day's work on October 20, 2019 until 7:40 p.m. on the same day (when the interruption occurred), for the flow of information related to the TREP workstations located in the SERECI offices. The flow of SERECI information passed through this hidden and unsecured server on a NEOTEC private network.

This is a first indication of intent to avoid using the official infrastructure agreed-upon prior to the election. The plan was to manipulate the infrastructure by moving the TREP flows through external servers, evading oversight by the audit company hired by the TSE.

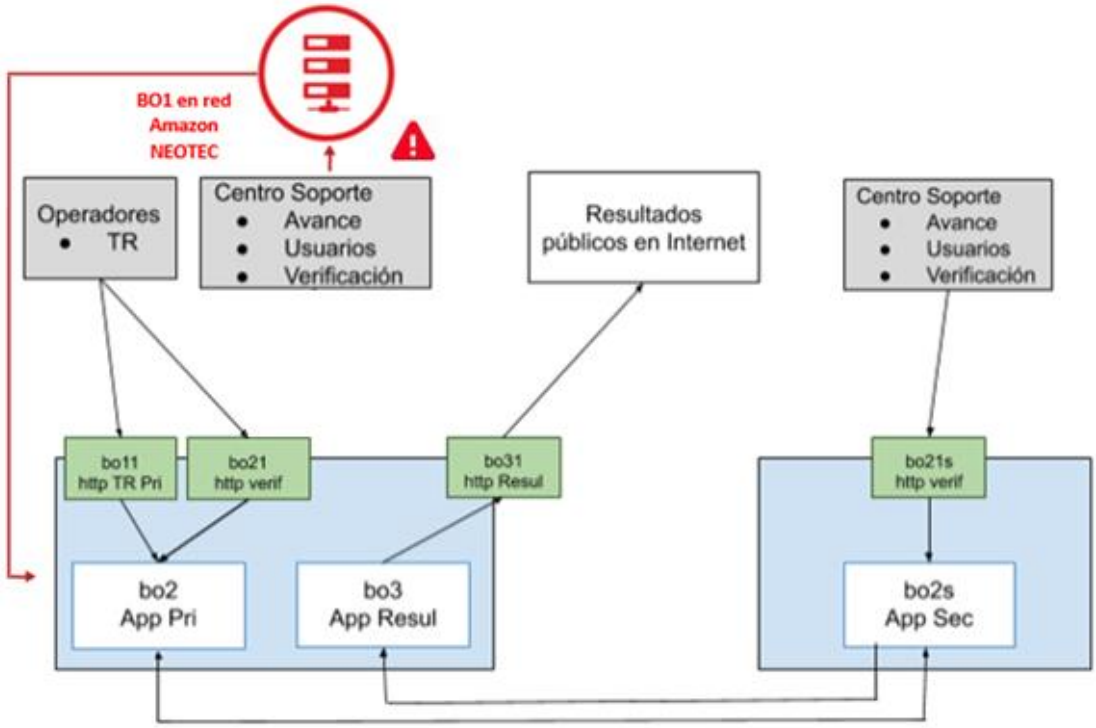
According to Ethical Hacking, server BO1 should not have been used, as it did not have the required security or a monitoring agent enabling the firm to properly monitor it. In its final report, the audit company states that it was not monitoring this flow of information because it evaded its monitoring system (for which the information would have had to flow as was planned in order to provide transparency).

Ethical Hacking goes into more detail in its report on this first unplanned server (BO1), which was used for an unauthorized purpose: "As far as the halting of the TREP, although it was found to be an error of omission in the protocol and this unauthorized change should not have happened, it is clear that the server did not fall within the scope of our monitoring. The redirection of all SERECI traffic to verify tally sheets—an important and sensitive task—to an external server fully outside the scope of our monitoring

means that we cannot attest to all the information that entered at that time. Thus, the electoral process loses all credibility by violating the security protocol."

The OAS expert auditors found that the server was on a NEOTEC Amazon network (administered at its discretion). This is a grave violation of the TREP's stated network topology that was the basis for the audit company to perform the monitoring. Is unacceptable that during a crucially important process like the TREP (which, in part, contributes to the official count), traffic would be redirected to a private server under the exclusive control of its owner.

The following graphic shows the true topology of the network until the TREP was halted:



True diagram of 10/20/2019 until 7:40 p.m., with TREP flow directed to NEOTEC private cloud

- **Audit evidence on TREP traffic belonging to the BO1 server**

The expert OAS auditors were able to find concrete evidence of the function of the BO1 server, which, it is reiterated, did not belong to the TREP and was being implemented on an Amazon network contracted and administered by NEOTEC. This was an intentional manipulation of the formal network topology of the TREP infrastructure.

There were no measures on that server intended to safeguard and save evidence (for example, logs), and the chain of custody was not respected, as from October 20, 2019, it was out of the TSE's control and controlled instead by NEOTEC.

Nevertheless, the logs that Ethical Hacking had in its possession were analyzed, as were the logs on the TSE's servers in the TREP network.

Evidence was thus obtained to indicate that the server was used to transcribe and verify the tally sheets, and for the flow of other related TREP data.

<u>Information from the report submitted as evidence</u>

- Origin IP
- Destination IP
- URL
- Method
- Occurrence (low: fewer than 200)

10.1.0.222,"10.1.0.159","/simobol_2019_3_TREP/process/VerificaActa/VerificaProxima",POST
Occurrences 162,570

10.1.0.222,"10.1.0.159","/simobol_2019_3_TREP/process/VerificaActa/list",POST
Occurrences 31,556

10.1.0.222,"10.1.0.159","/simobol_2019_3_TREP/process/Acta/list",POST
Occurrences 7,552

10.1.0.222,"10.1.0.159","/simobol_2019_3_TREP/process/sid3/module",POST
Occurrences 3,723

10.1.0.222,"10.1.0.159","/simobol_2019_3_TREP/gkeys",POST
Occurrences 2,670

10.1.0.222,"3.231.68.158","/simobol_2019_3_TREP/process/Acta/list",POST
Occurrences low

10.1.0.222,"3.231.68.158","/simobol_2019_3_TREP/process/Acta/row/1702583",POST
Occurrences low

10.1.0.222,"3.231.68.158","/simobol_2019_3_TREP/process/Acta/thumbView/Imagen/1702583",GET
Occurrences low

10.1.0.222,"3.231.68.158","/simobol_2019_3_TREP/process/AvanceDep/list",POST
Occurrences low

- **SSH access to BO1, taking control later as root**

Additionally, SSH access (outside the application) to the BO1 server was confirmed, with privileges later escalated to root (superuser). The following fragments show activity on BO1 during the morning of October 20, 2019, in the evening (while the TREP was halted), and on October 21, when the TREP had recommenced.

The following are only three log fragments as evidence of that access:

<u>During the morning of October 20, 2019</u>

Oct 20 10:05:23 bo1 sshd[2910]: Accepted publickey for ec2-user from 181.115.131.216 port 18882 ssh2: RSA SHA256:hi2C+Gu62BrRMUBuFRoHBDvFJVuq/dzIy7aDZFnhaLA

Oct 20 10:05:23 bo1 sshd[2910]: pam_unix(sshd:session): session opened for user ec2-user by (uid=0)

Oct 20 10:05:37 bo1 sudo: ec2-user : TTY=pts/0 ; PWD=/home/ec2-user ; USER=root ; COMMAND=/bin/cat /etc/nginx/nginx.conf

Oct 20 10:30:37 bo1 sudo: ec2-user : TTY=pts/0 ; PWD=/home/ec2-user ; USER=root ; COMMAND=/bin/grep client_max_body_size /etc/nginx/nginx.conf

Oct 20 10:35:01 bo1 sudo: ec2-user : TTY=pts/0 ; PWD=/home/ec2-user ; USER=root ; COMMAND=/bin/grep client_max_body_size /etc/nginx/nginx.conf

Oct 20 10:49:38 bo1 sshd[2912]: error: Received disconnect from 181.115.131.216 port 18882:0:

Oct 20 10:49:38 bo1 sshd[2912]: Disconnected from 181.115.131.216 port 18882

Oct 20 10:49:38 bo1 sshd[2910]: pam_unix(sshd:session): session closed for user ec2-user

Oct 20 11:00:34 bo1 sshd[3016]: Accepted publickey for ec2-user from 181.115.131.216 port 18883 ssh2: RSA SHA256:hi2C+Gu62BrRMUBuFRoHBDvFJVuq/dzIy7aDZFnhaLA

Oct 20 11:00:34 bo1 sshd[3016]: pam_unix(sshd:session): session opened for user ec2-user by (uid=0)

Oct 20 11:01:04 bo1 sudo: ec2-user : TTY=pts/0 ; PWD=/home/ec2-user ; USER=root ; COMMAND=/bin/cat /etc/nginx/conf.d/bo1.conf

Oct 20 14:23:57 bo1 sshd[3016]: pam_unix(sshd:session): session closed for user ec2-user

During the evening of October 20, 2019 (while the TREP was halted)

Oct 20 21:30:02 bo1 sshd[4030]: Accepted publickey for ec2-user from 10.8.10.6 port 57625 ssh2: RSA SHA256:hi2C+Gu62BrRMUBuFRoHBDvFJVuq/dzIy7aDZFnhaLA

Oct 20 21:30:02 bo1 sshd[4030]: pam_unix(sshd:session): session opened for user ec2-user by (uid=0)

Oct 20 21:39:22 bo1 sudo: ec2-user : TTY=pts/0 ; PWD=/home/ec2-user ; USER=root ; COMMAND=/bin/su

Oct 20 21:39:22 bo1 su: pam_unix(su:session): session opened for user root by ec2-user(uid=0)

Oct 20 22:03:34 bo1 su: pam_unix(su:session): session closed for user root

Oct 20 22:03:34 bo1 sshd[4032]: Received disconnect from 10.8.10.6 port 57625:11: disconnected by user

Oct 20 22:03:34 bo1 sshd[4032]: Disconnected from 10.8.10.6 port 57625

Oct 20 22:03:34 bo1 sshd[4030]: pam_unix(sshd:session): session closed for user ec2-user

Oct 20 22:03:50 bo1 sshd[4173]: Accepted publickey for ec2-user from 10.8.10.6 port 58124 ssh2: RSA SHA256:hi2C+Gu62BrRMUBuFRoHBDvFJVuq/dzIy7aDZFnhaLA

Oct 20 22:03:50 bo1 sshd[4173]: pam_unix(sshd:session): session opened for user ec2-user by (uid=0)

Oct 20 22:05:10 bo1 sudo: ec2-user : TTY=pts/0 ; PWD=/tmp/logs ; USER=root ; COMMAND=/bin/cp /home/ec2-user/.ssh/authorized_keys authorized_keys.ec2-user

Oct 20 22:05:19 bo1 sudo: ec2-user : TTY=pts/0 ; PWD=/tmp/logs ; USER=root ; COMMAND=/bin/su

Oct 20 22:05:19 bo1 su: pam_unix(su:session): session opened for user root by ec2-user(uid=0)

Oct 20 22:19:37 bo1 sshd[4257]: Accepted publickey for ec2-user from 10.8.10.6 port 58181 ssh2: RSA SHA256:hi2C+Gu62BrRMUBuFRoHBDvFJVuq/dzIy7aDZFnhaLA

Oct 20 22:19:37 bo1 sshd[4257]: pam_unix(sshd:session): session opened for user ec2-user by (uid=0)

Oct 20 22:19:38 bo1 sshd[4259]: Received disconnect from 10.8.10.6 port 58181:11: disconnected by user

Oct 20 22:19:38 bo1 sshd[4259]: Disconnected from 10.8.10.6 port 58181

Oct 20 22:19:38 bo1 sshd[4257]: pam_unix(sshd:session): session closed for user ec2-user

Oct 20 22:19:47 bo1 sshd[4272]: Accepted publickey for ec2-user from 10.8.10.6 port 58184 ssh2: RSA SHA256:hi2C+Gu62BrRMUBuFRoHBDvFJVuq/dzIy7aDZFnhaLA

Oct 20 22:19:47 bo1 sshd[4272]: pam_unix(sshd:session): session opened for user ec2-user by (uid=0)

Oct 20 22:20:37 bo1 sshd[4274]: Received disconnect from 10.8.10.6 port 58184:11: disconnected by user

Oct 20 22:20:37 bo1 sshd[4274]: Disconnected from 10.8.10.6 port 58184

Oct 20 22:20:37 bo1 sshd[4272]: pam_unix(sshd:session): session closed for user ec2-user

Oct 20 22:22:35 bo1 sshd[4286]: Accepted publickey for ec2-user from 10.8.10.6 port 58196 ssh2: RSA SHA256:hi2C+Gu62BrRMUBuFRoHBDvFJVuq/dzIy7aDZFnhaLA

Oct 20 22:22:35 bo1 sshd[4286]: pam_unix(sshd:session): session opened for user ec2-user by (uid=0)

Oct 20 22:37:30 bo1 sshd[4288]: Received disconnect from 10.8.10.6 port 58196:11: disconnected by user

Oct 20 22:37:30 bo1 sshd[4288]: Disconnected from 10.8.10.6 port 58196

Oct 20 22:37:30 bo1 sshd[4286]: pam_unix(sshd:session): session closed for user ec2-user

Oct 20 22:37:32 bo1 su: pam_unix(su:session): session closed for user root

Oct 20 22:37:33 bo1 sshd[4175]: Received disconnect from 10.8.10.6 port 58124:11: disconnected by user

Oct 20 22:37:33 bo1 sshd[4175]: Disconnected from 10.8.10.6 port 58124

Oct 20 22:37:33 bo1 sshd[4173]: pam_unix(sshd:session): session closed for user ec2-user

Del 21 de octubre de 2019 (ya reanudado el TREP)

Oct 21 13:18:10 bo1 sshd[5814]: Accepted publickey for ec2-user from 186.2.94.205 port 17602 ssh2: RSA SHA256:hi2C+Gu62BrRMUBuFRoHBDvFJVuq/dzIy7aDZFnhaLA

Oct 21 13:18:10 bo1 sshd[5814]: pam_unix(sshd:session): session opened for user ec2-user by (uid=0)

Oct 21 13:18:13 bo1 sudo: ec2-user : TTY=pts/0 ; PWD=/home/ec2-user ; USER=root ; COMMAND=/bin/su

Oct 21 13:18:13 bo1 su: pam_unix(su:session): session opened for user root by ec2-user(uid=0)

Oct 21 15:31:16 bo1 sshd[5814]: pam_unix(sshd:session): session closed for user ec2-user

Oct 21 15:31:16 bo1 su: pam_unix(su:session): session closed for user root

Detection of databases and applications on server BO1

It is also noted that electoral databases and applications were detected on that server, something that is inexplicable and unacceptable in an electoral process.

The following image indicates the existence of databases that do not belong on a perimeter server:

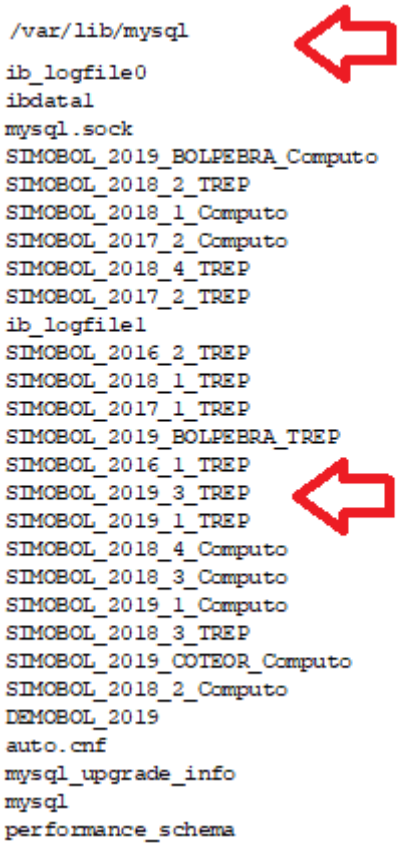


Image taken by OAS auditors during examination of server BO1

During the audit, it was confirmed that server BO1 had stayed on following the halt of the TREP, assigned to other tasks. This is demonstrated by a fragment of the logs:

113.163.126.70 - - [25/Oct/2019:03:56:35 -0400] "GET / HTTP/1.0" 200 3770 "-" "-" "-"

181.188.160.207 - - [25/Oct/2019:04:14:16 -0400] "GET /simobol_2019_3_TREP/css/bootstrap.min.css HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:16 -0400] "GET /simobol_2019_3_TREP/css/sid3.css HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:16 -0400] "GET /simobol_2019_3_TREP/js/jquery-3.4.1.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:16 -0400] "GET /simobol_2019_3_TREP/js/bootstrap3-typeahead.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0

(Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:16 -0400] "GET /simobol_2019_3_TREP/js/bootstrap.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:16 -0400] "GET /simobol_2019_3_TREP/simonel.png HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:16 -0400] "GET /simobol_2019_3_TREP/js/sid3.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:17 -0400] "GET /simobol_2019_3_TREP/js/bootstrap3-typeahead.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:17 -0400] "GET /simobol_2019_3_TREP/js/sid3.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:17 -0400] "GET /simobol_2019_3_TREP/css/bootstrap.min.css HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:17 -0400] "GET /simobol_2019_3_TREP/css/sid3.css HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:17 -0400] "GET /simobol_2019_3_TREP/js/jquery-3.4.1.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:18 -0400] "GET /simobol_2019_3_TREP/js/bootstrap.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0;

Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:18 -0400] "GET /simobol_2019_3_TREP/js/bootstrap3-typeahead.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:18 -0400] "GET /simobol_2019_3_TREP/js/sid3.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:18 -0400] "GET /simobol_2019_3_TREP/js/jquery-3.4.1.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:18 -0400] "GET /simobol_2019_3_TREP/simonel.png HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:18 -0400] "GET /simobol_2019_3_TREP/js/bootstrap.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:18 -0400] "GET /simobol_2019_3_TREP/js/bootstrap3-typeahead.min.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:18 -0400] "GET /simobol_2019_3_TREP/js/sid3.js HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:19 -0400] "GET /simobol_2019_3_TREP/ HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

181.188.160.207 - - [25/Oct/2019:04:14:20 -0400] "GET /favicon.ico HTTP/1.1" 404 555 "https://bo.neotec.cc/simobol_2019_3_TREP/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/76.0.3809.132 Safari/537.36 OPR/63.0.3368.107" "-"

It is important to find out who authorized this design and implemented this infrastructure, which reveals the manipulation of the official TREP topology. These findings reveal the existence of an organized group whose aim was to build a hidden I.T. structure.

- **Recommencing the TREP to another unplanned and hidden server (BO20)**

The OAS audit found that after the TREP was interrupted, the flow of transcription information was again redirected. This time, it was directed to a server named BO20 that was also not included among those planned for the TREP in the cloud, nor was it part of the physical equipment of the National Information Technology Directorate (DNTIC). Furthermore, it was not overseen by the audit company, by SERECI officials, or by technical personnel of the DNTIC. The situation is made graver by the essential fact that no mention of this server was made in the reports turned over by the tribunal, and everyone involved omitted mention of its existence until it was detected by the OAS expert auditors.

Redirecting all the SERECI traffic for verifying and approving tally sheets to a server on an external network is suspicious from the perspective of information control and a high risk to information integrity. This task was both fundamental and sensitive, but no one could provide technical certainty or take responsibility for the decision.

When he was questioned after the discovery, the technical head of the DNTIC acknowledged knowing about this server (BO20) and denied that it was he who had ordered the change of flow, adding that he had not been the one who was controlling or overseeing it either. It should be noted that, initially, he did not provide any information about this hidden server, even though he had participated previously in meetings and discussions with the OAS audit team that was analyzing the TREP data flow.

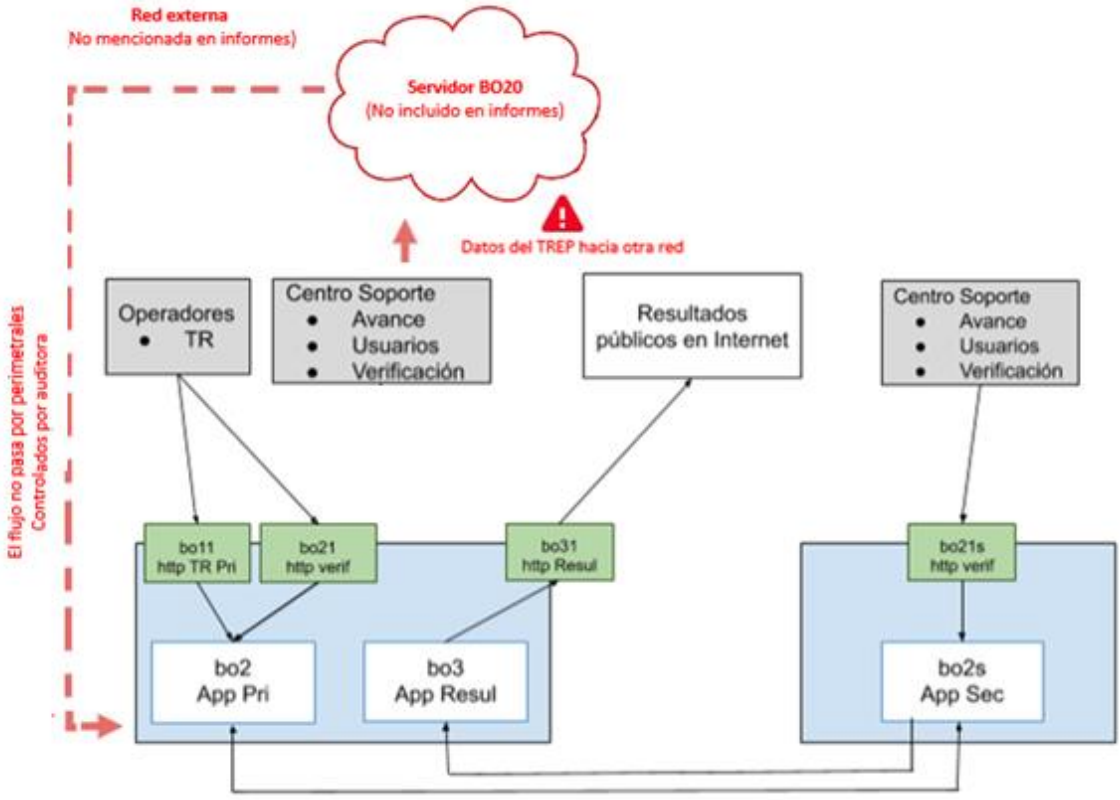


Diagram showing the SERECI flow redirected to an external network, evading the controls of the audit company

A change of this magnitude in the middle of an electoral process (at that time, the TREP system and the official count were operating) is unusual. There is also no valid technical explanation for the failure to use the perimeter servers controlled by the audit company. This is extremely serious and impacts the transparency of the process. No one can explain why the audit company's controls were evaded and traffic was redirected to a network outside the domain, administration, control, and monitoring of TSE staff.

Allowing this type of topology, with hidden servers and/or external networks over which there is no control, enables tampering with electoral information and images, as well as the concealment of evidence in a highly volatile situation. This is consistent with the existence of an organized group whose intention is to re-direct the data flow to an outside network that had neither been contemplated nor documented.

It should once again be underscored that this re-direction to server BO20 (in the cloud) was not included in any of the reports delivered by the TSE to the OAS audit team, nor was it mentioned by the technical areas until it was discovered by the expert auditors.

- **Audit evidence on TREP traffic belonging to the B2O server**

Through analysis of the traffic, the OAS expert auditors were able to secure concrete evidence of this second manipulation of the TREP technology infrastructure network topology.

This case involved the aforementioned server BO20 (IP 18.220.48.51) implemented on an outside network and hidden from the audit team from its arrival in La Paz, omitted from all reports, and not mentioned by the technical personnel interviewed until it was detected.

As indicated, this server was not under control of the audit company, and its network did not have any security from SERECI, DNTIC, or the audit company.

Server BO20 (IP 18.220.48.51), omitted in all the reports prior to the arrival of the OAS audit team and whose existence was concealed until it was discovered by the expert auditors, was implemented on an Amazon network at the decision of the TSE members—in the absence of TSE member Mr. Costas—with the assistance of an advisor who was not introduced to the Mission and apparently served as an OEP information security official during the electoral process. It should be noted that no information or access to reports that this advisor may have prepared on the incidents in question were obtained.

As in the case of server BO1, server BO20 had no measures intended to save and protect evidence (for example, logs). Despite these conditions regarding this server, the logs that Ethical Hacking had in its possession were analyzed, as were the logs on the TSE's servers in the TREP network.

Evidence was thus obtained to indicate that the server was used to transcribe and verify the tally sheets, and for the flow of other related TREP data. Considered in this case are the queries received by the BO2 primary TREP server from the server named BO20.

<u>Section of data provided as evidence:</u>

- Date;

- Time;
- Origin IP;
- Method;
- URL on server BO2.

A segment is extracted as evidence from October 21, following the restarting of the TREP:

"Oct 21, 2019 @ 15:21:42.753","18.220.48.51",GET,"/simobol_2019_3_TREP/css/bootstrap.min.css"

"Oct 21, 2019 @ 15:21:42.753","18.220.48.51",GET,"/simobol_2019_3_TREP/css/sid3.css"

"Oct 21, 2019 @ 15:21:42.753","18.220.48.51",GET,"/simobol_2019_3_TREP/js/bootstrap.min.js"

"Oct 21, 2019 @ 15:21:42.753","18.220.48.51",GET,"/simobol_2019_3_TREP/js/jquery-3.4.1.min.js"

"Oct 21, 2019 @ 15:21:42.753","18.220.48.51",GET,"/simobol_2019_3_TREP/simonel.png"

"Oct 21, 2019 @ 15:58:42.314","18.220.48.51",POST,"/simobol_2019_3_TREP/process/VerificaActa/VerificaProxima"

"Oct 21, 2019 @ 16:01:43.451","18.220.48.51",POST,"/simobol_2019_3_TREP/process/VerificaActa/VerificaProxima"

"Oct 21, 2019 @ 16:04:00.902","18.220.48.51",POST,"/simobol_2019_3_TREP/process/VerificaActa/VerificaProxima"

"Oct 21, 2019 @ 16:04:00.902","18.220.48.51",POST,"/simobol_2019_3_TREP/process/VerificaActa/list"

Activity with this hidden server continued over subsequent days

A segment is extracted as evidence from October 24, recording activity:

"Oct 24, 2019 @ 14:05:55.774","18.220.48.51",GET,"/simobol_2019_3_TREP/css/bootstrap.min.css"

"Oct 24, 2019 @ 14:05:55.774","18.220.48.51",GET,"/simobol_2019_3_TREP/css/sid3.css"

"Oct 24, 2019 @ 14:05:55.774","18.220.48.51",GET,"/simobol_2019_3_TREP/js/bootstrap.min.js"

"Oct 24, 2019 @ 14:05:55.774","18.220.48.51",GET,"/simobol_2019_3_TREP/js/bootstrap3-typeahead.min.js"

"Oct 24, 2019 @ 14:05:55.774","18.220.48.51",GET,"/simobol_2019_3_TREP/js/jquery-3.4.1.min.js"

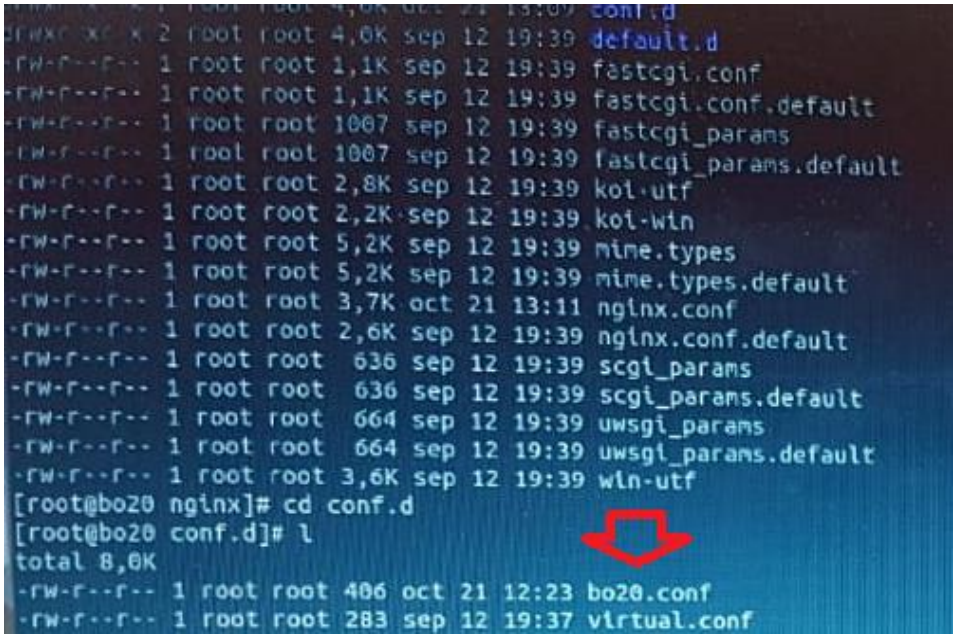


Image captured of the server discovered as BO20 upon review of IP address 18.220.48.51

Image taken of the audit company confirming that the BO20 IP address belongs to neither the TREP nor the official count.

Other data sources on BO2 where evidence is found:

Oct 21, 2019 @ 14:50:18.145 18.220.48.51 - - [21/Oct/2019:13:50:00 -0400] "GET /simobol_2019_3_TREP/css/sid3.css HTTP/1.0" 200 1936 /simobol_2019_3_TREP/css/sid3.css Oct 21, 2019 @ 14:50:18.145

Oct 21, 2019 @ 14:50:18.229 18.220.48.51 - - [21/Oct/2019:13:50:00 -0400] "GET /simobol_2019_3_TREP/js/bootstrap.min.js HTTP/1.0" 200 39680 /simobol_2019_3_TREP/js/bootstrap.min.js Oct 21, 2019 @ 14:50:18.229

Oct 21, 2019 @ 14:50:18.234 18.220.48.51 - - [21/Oct/2019:13:50:00 -0400] "GET /simobol_2019_3_TREP/js/jquery-3.4.1.min.js HTTP/1.0" 200 88145 /simobol_2019_3_TREP/js/jquery-3.4.1.min.js Oct 21, 2019 @ 14:50:18.234

Oct 21, 2019 @ 14:50:18.239 18.220.48.51 - - [21/Oct/2019:13:50:00 -0400] "GET /simobol_2019_3_TREP/simonel.png HTTP/1.0" 200 1703 /simobol_2019_3_TREP/simonel.png Oct 21, 2019 @ 14:50:18.239

Oct 21, 2019 @ 14:50:18.333 18.220.48.51 - - [21/Oct/2019:13:50:01 -0400] "GET /simobol_2019_3_TREP/js/bootstrap3-typeahead.min.js HTTP/1.0" 200 7784 /simobol_2019_3_TREP/js/bootstrap3-typeahead.min.jsOct 21, 2019 @ 14:50:18.333

Oct 21, 2019 @ 14:50:18.385 18.220.48.51 - - [21/Oct/2019:13:50:01 -0400] "GET /simobol_2019_3_TREP/js/sid3.js HTTP/1.0" 200 75760 /simobol_2019_3_TREP/js/sid3.js Oct 21, 2019 @ 14:50:18.385

Oct 21, 2019 @ 14:50:37.607 18.220.48.51 - - [21/Oct/2019:13:50:20 -0400] "GET /simobol_2019_3_TREP/css/bootstrap.min.css HTTP/1.0" 200 121457 /simobol_2019_3_TREP/css/bootstrap.min.css Oct 21, 2019 @ 14:50:37.607

Oct 21, 2019 @ 14:50:37.609 18.220.48.51 - - [21/Oct/2019:13:50:20 -0400] "GET /simobol_2019_3_TREP/css/sid3.css HTTP/1.0" 200 1936 /simobol_2019_3_TREP/css/sid3.css Oct 21, 2019 @ 14:50:37.609

Oct 21, 2019 @ 14:50:37.667 18.220.48.51 - - [21/Oct/2019:13:50:20 -0400] "GET /simobol_2019_3_TREP/js/jquery-3.4.1.min.js HTTP/1.0" 200 88145 /simobol_2019_3_TREP/js/jquery-3.4.1.min.js Oct 21, 2019 @ 14:50:37.667

Oct 21, 2019 @ 14:50:37.671 18.220.48.51 - - [21/Oct/2019:13:50:20 -0400] "GET /simobol_2019_3_TREP/simonel.png HTTP/1.0" 200 1703 /simobol_2019_3_TREP/simonel.png Oct 21, 2019 @ 14:50:37.671

Oct 21, 2019 @ 14:50:37.718 18.220.48.51 - - [21/Oct/2019:13:50:20 -0400] "GET /simobol_2019_3_TREP/js/bootstrap.min.js HTTP/1.0" 200 39680 /simobol_2019_3_TREP/js/bootstrap.min.js Oct 21, 2019 @ 14:50:37.718

Oct 21, 2019 @ 14:50:37.766 18.220.48.51 - - [21/Oct/2019:13:50:20 -0400] "GET /simobol_2019_3_TREP/js/bootstrap3-typeahead.min.js HTTP/1.0" 200 7784 /simobol_2019_3_TREP/js/bootstrap3-typeahead.min.jsOct 21, 2019 @ 14:50:37.766

Oct 21, 2019 @ 14:50:37.817 18.220.48.51 - - [21/Oct/2019:13:50:20 -0400] "GET /simobol_2019_3_TREP/js/sid3.js HTTP/1.0" 200 75760 /simobol_2019_3_TREP/js/sid3.js Oct 21, 2019 @ 14:50:37.817

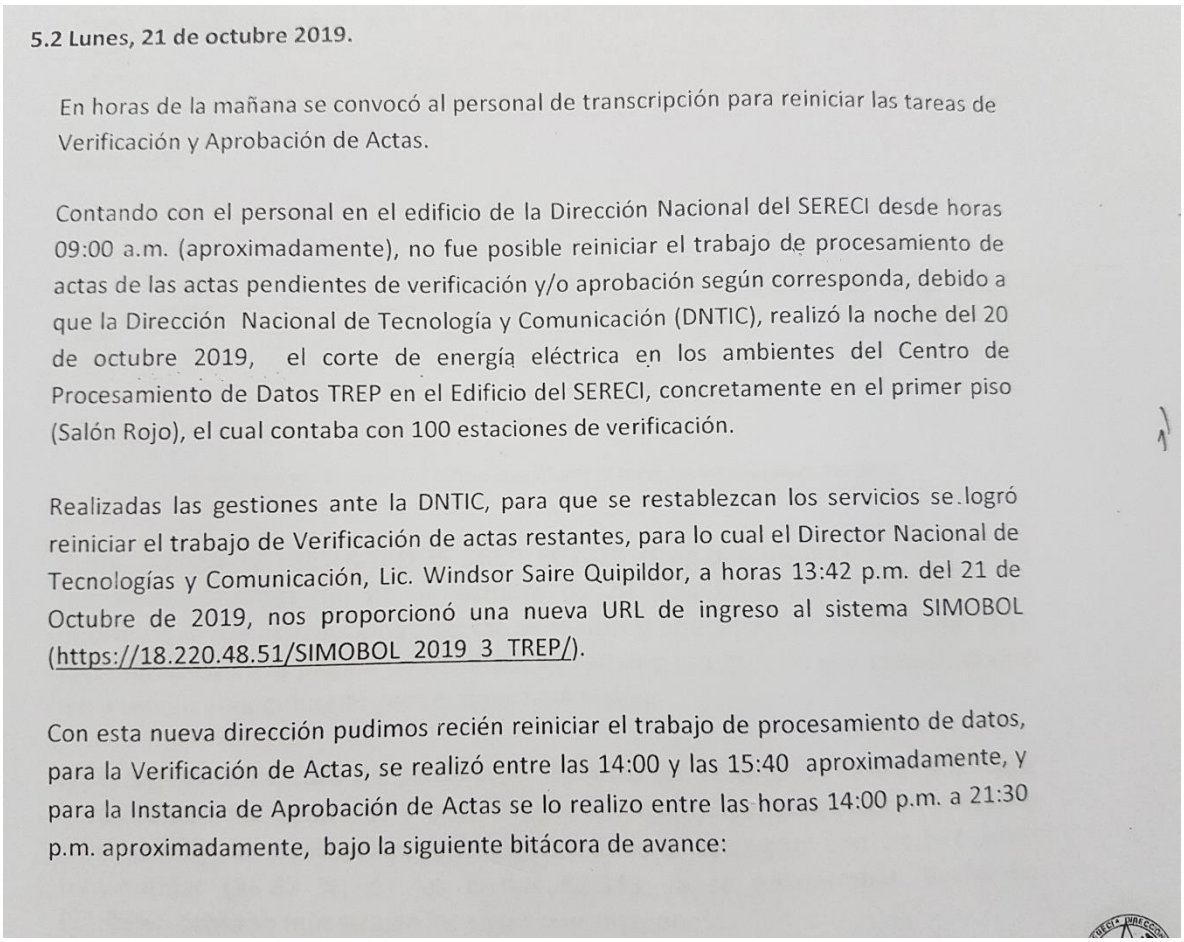
Oct 21, 2019 @ 14:50:47.701 18.220.48.51 - - [21/Oct/2019:13:50:30 -0400] "GET /simobol_2019_3_TREP/simonel.ico HTTP/1.0" 200 99678 /simobol_2019_3_TREP/simonel.ico Oct 21, 2019 @ 14:50:47.701

Oct 21, 2019 @ 14:50:47.705 18.220.48.51 - - [21/Oct/2019:13:50:30 -0400] "POST /simobol_2019_3_TREP/process/sid3/module HTTP/1.0" 200 22 /simobol_2019_3_TREP/process/sid3/module Oct 21, 2019 @ 14:50:47.705

- **Acknowledgment of server BO20**

Following detection of server BO20 by the OAS audit team, the SERECI head and a technical staff member there delivered a document to OAS offices that, for the first time, showed the expert auditors

the IP address confirming that data was directed to this server. It should be noted that this IP address is not included in any of the TREP infrastructure diagrams and was hidden in other documents.



5.2 Lunes, 21 de octubre 2019.

En horas de la mañana se convocó al personal de transcripción para reiniciar las tareas de Verificación y Aprobación de Actas.

Contando con el personal en el edificio de la Dirección Nacional del SERECI desde horas 09:00 a.m. (aproximadamente), no fue posible reiniciar el trabajo de procesamiento de actas de las actas pendientes de verificación y/o aprobación según corresponda, debido a que la Dirección Nacional de Tecnología y Comunicación (DNTIC), realizó la noche del 20 de octubre 2019, el corte de energía eléctrica en los ambientes del Centro de Procesamiento de Datos TREP en el Edificio del SERECI, concretamente en el primer piso (Salón Rojo), el cual contaba con 100 estaciones de verificación.

Realizadas las gestiones ante la DNTIC, para que se restablezcan los servicios se logró reiniciar el trabajo de Verificación de actas restantes, para lo cual el Director Nacional de Tecnologías y Comunicación, Lic. Windsor Saire Quipildor, a horas 13:42 p.m. del 21 de Octubre de 2019, nos proporcionó una nueva URL de ingreso al sistema SIMOBOL (https://18.220.48.51/SIMOBOL_2019_3_TREP/).

Con esta nueva dirección pudimos recién reiniciar el trabajo de procesamiento de datos, para la Verificación de Actas, se realizó entre las 14:00 y las 15:40 aproximadamente, y para la Instancia de Aprobación de Actas se lo realizo entre las horas 14:00 p.m. a 21:30 p.m. aproximadamente, bajo la siguiente bitácora de avance:

Image taken from the report delivered by the SERECI to the OAS on 11/6/2019 at 11:00 a.m.

The re-directing of information to this server could have been used for data manipulation, forgery of tally sheets, or any other scheme, facilitated by the volatility of the digital evidence, in a highly manipulable environment. Not even the audit company, which states that the elections were fundamentally flawed to the point of being invalid, mentions server BO20.

In the context of a presidential election, and after the audit company has called it impossible to guarantee the integrity of the results, it is extremely grave to then make a discovery of this magnitude, which in itself calls into question the integrity of the process.

It should be noted that the existence of server BO20 on an Amazon network (not planned for or declared) was, in the end, corroborated by a supplementary report[11] issued by NEOTEC on November 4, 2019, accepting its existence from the recommencement of the TREP. This report was issued after the OAS expert auditors revealed the discovery and notified all the technical actors.

[11] Annex 5 – Supplementary NEOTEC report

ec2-18-220-48-51.us-east-2.compute.amazonaws.com (18.220.48.51)

18.128.0.0 - 18.255.255.255
Amazon Technologies Inc. AT-88-Z (NET-129-160-0-0-1) 129.160.0.0 - 129.160.255.255
Amazon Technologies Inc. AT-88-Z (NET-129-47-0-0-1) 129.47.0.0 - 129.47.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-112-0-0-1) 13.112.0.0 - 13.115.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-124-0-0-1) 13.124.0.0 - 13.127.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-200-0-0-1) 13.200.0.0 - 13.207.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-208-0-0-1) 13.208.0.0 - 13.211.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-212-0-0-1) 13.212.0.0 - 13.215.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-224-0-0-1) 13.224.0.0 - 13.227.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-228-0-0-1) 13.228.0.0 - 13.239.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-244-0-0-1) 13.244.0.0 - 13.247.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-248-0-0-1) 13.248.0.0 - 13.251.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-32-0-0-1) 13.32.0.0 - 13.47.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-48-0-0-1) 13.48.0.0 - 13.51.255.255
Amazon Technologies Inc. AT-88-Z (NET-13-52-0-0-1) 13.52.0.0 - 13.59.255.255
Amazon Technologies Inc. AT-88-Z (NET-137-114-0-0-1) 137.114.0.0 - 137.114.255.255
Amazon Technologies Inc. AT-88-Z (NET-140-145-0-0-1) 140.145.0.0 - 140.145.255.255
Amazon Technologies Inc. AT-88-Z (NET-143-204-0-0-1) 143.204.0.0 - 143.204.255.255
Amazon Technologies Inc. AT-88-Z (NET-144-207-0-0-1) 144.207.0.0 - 144.207.255.255
Amazon Technologies Inc. AT-88-Z (NET-144-220-0-0-1) 144.220.0.0 - 144.220.255.255
Amazon Technologies Inc. AT-88-Z (NET-144-40-0-0-1) 144.40.0.0 - 144.40.255.255
Amazon Technologies Inc. AT-88-Z (NET-146-78-0-0-1) 146.78.0.0 - 146.78.255.255
Amazon Technologies Inc. AT-88-Z (NET-149-80-0-0-1) 149.80.0.0 - 149.80.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-161-0-0-1) 15.161.0.0 - 15.161.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-164-0-0-1) 15.164.0.0 - 15.165.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-168-0-0-1) 15.168.0.0 - 15.168.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-172-0-0-1) 15.172.0.0 - 15.172.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-177-0-0-1) 15.177.0.0 - 15.177.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-185-0-0-1) 15.185.0.0 - 15.185.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-188-0-0-1) 15.188.0.0 - 15.188.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-190-0-0-1) 15.190.0.0 - 15.190.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-193-0-0-1) 15.193.0.0 - 15.193.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-197-0-0-1) 15.197.0.0 - 15.197.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-200-0-0-1) 15.200.0.0 - 15.200.255.255
Amazon Technologies Inc. AT-88-Z (NET-15-205-0-0-1) 15.205.0.0 - 15.205.255.255

Validation of IP as part of an Amazon cloud network

Nombre	Descripcion	IP Publica	IP Interna	Tipo	Zona	RAM	CPU	Disco
bo2	Servidor de Aplicaciones TR principal TREP	3.231.68.158	10.1.0.159	c5.9xlarge	Virginia	72	36	200
bo11	Servidor Perimetral TR principal TREP	34.238.92.97	10.1.0.235	t3.small	Virginia	4	2	20
bo21	Servidor Perimetral TR secundario TREP	18.213.171.115	10.1.0.84	t3.small	Virginia	4	2	20
bo2s	Servidor de Aplicaciones TR secundario	34.248.110.200	10.2.0.191	t4.large	Irlanda	8	4	200
bo21	Servidor Perimetral TR secundario TREP	18.213.171.115	10.1.0.84	t3.small	Virginia	4	2	20
bo21s	Servidor Perimetral Verif secundario	52.48.94.20	10.2.0.12	t3.small	Irlanda	4	2	20
bo3	Servidor de Aplicaciones Resultados TREP	3.229.191.112	10.1.0.229	c5.2xlarge	Virginia	16	8	200
bo31	Servidor Perimetral Resultados TREP	34.225.16.65	10.1.0.53	c5.xlarge	Virginia	8	4	50
bo4	Servidor de Aplicaciones Resultados Cómputo	3.229.71.185	10.1.0.182	c5.xlarge	Virginia	16	8	200
bo41	Servidor Perimetral Resultados Cómputo	34.226.241.252	10.1.0.66	c5.large	Virginia	4	2	50
oep2	Servidor de Aplicaciones Cómputo en TSE		10.100.88.24		TSE	16	4	200
oep1	Servidor Perimetral Verif principal Cómputo en TSE		10.100.87.23		TSE	4	2	20
bo5	Servidor de Aplicaciones Cómputo Secundario	3.231.75.175	10.1.0.21	t3.large	Virginia	8	2	200
bo51	Servidor Perimetral Verif Cómputo Secundario	35.168.135.134	10.1.0.42	t3.small	Virginia	4	2	20

Official list of servers declared for the TREP. Issued by NEOTEC and confirmed by Ethical Hacking

This server list clearly shows that servers BO1 and BO20 (which was detected on a third-party network outside the process) are not declared, and therefore should not have been used.

SERECI personnel, the NEOTEC representative in Bolivia, and the individual responsible at the DNTIC said there was absolutely no technical reason for halting the TREP. They also said there was no reason to redirect traffic to an outside network not controlled by them, and that they were not part of this decision. In this context emerges the figure of an I.T. advisor with the tribunal, who was not part of SERECI staff, was not hired by NEOTEC, was not part of DNTIC staff, and certainly was not part of Ethical Hacking. The individual was apparently in charge of I.T. security at OEP only during the process, did not submit any reports to the OAS audit team, and was not introduced to the expert auditors by the TSE as an official. This information was also delivered in writing to the auditors in a letter (attached) with names redacted to protect the identity and personal information of the individuals involved; however, it has been sent to the Office of the Public Prosecutor.

- **Redirection of the 350 SERECI machines to server BO20**

To re-direct the flow of information generated in SERECI to the (BO20) server, the IP address to which the 350 machines used in SERECI were directed was altered. This occurred even though there were servers in the TREP network that were ready and overseen by the audit company inside the network, and all that would have been needed was changes to the parameters on a monitored server.

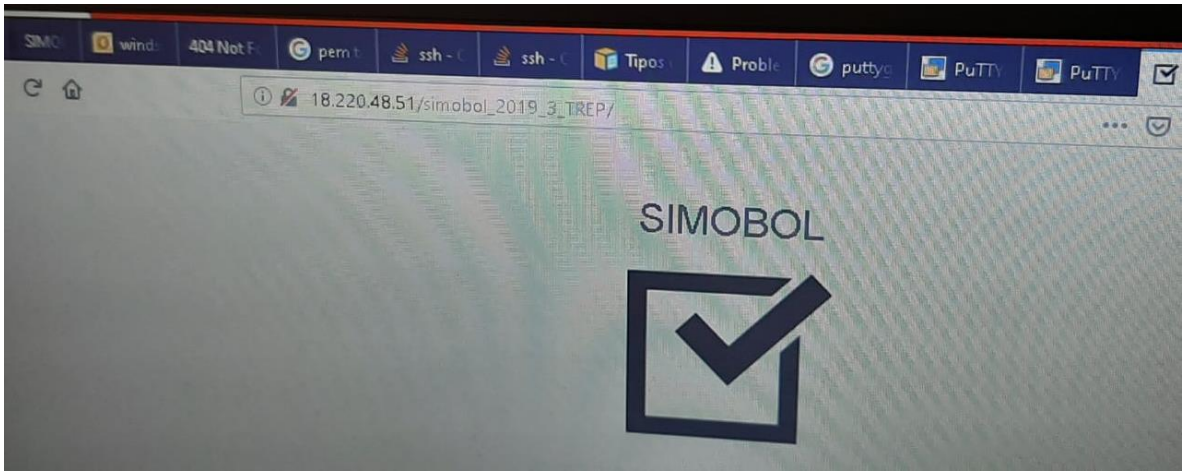
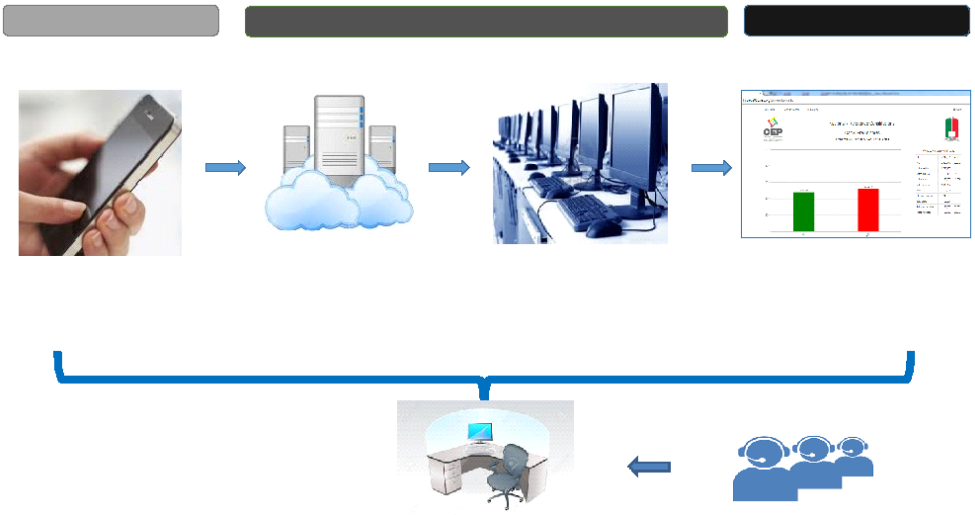


Image of IP address on SERECI machines directing them to an outside network



– **TREP data flows through two different routes, neither controlled by the audit company**

Based on the aforementioned findings, the OAS audit team reveals that the flow of TREP tally sheets passed through two different routes not controlled by the audit company, contrary to what was planned.

Up to the point the TREP was halted, as described, the flow was directed to a private server controlled by NEOTEC that was not part of the TREP or the official count, whose operation was initially described as a server for TSE consultation.

Once the TREP processing recommenced, on October 21, 2019, the information flow was redirected to server BO20, whose existence was discovered by the OAS audit team, and the information was sent directly to the public IP address of the primary TREP server (BO2). There is no explanation for the flow evading the controls of the audit company and no justification for hiding this server.

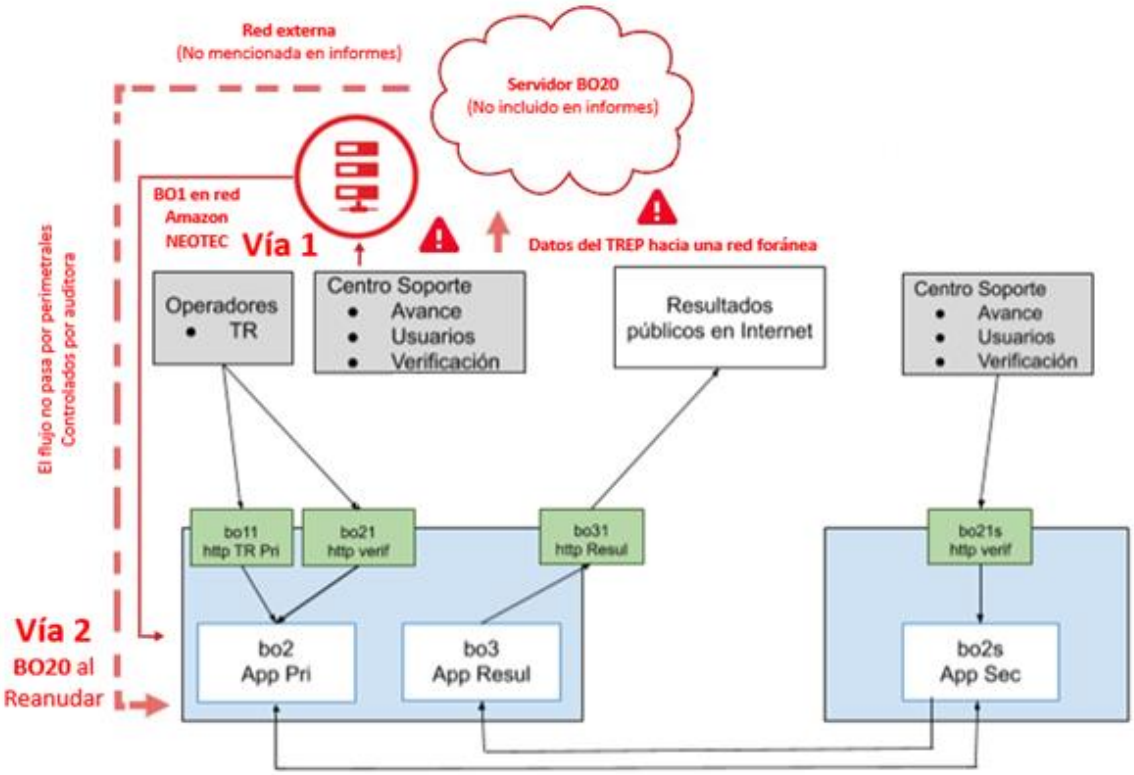


Diagram showing the two routes taken by SERECI data, evading monitoring

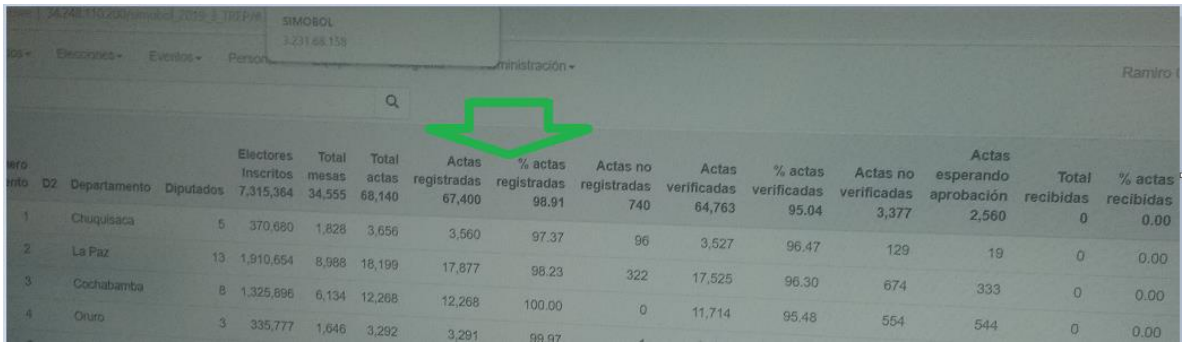
This server (BO20) was the second route through which the TREP flow was directed (in addition to the server BO1, which had been the initial route until 7:40 p.m.), hiding it from the TREP network and Ethical Hacking's controls.

From a breakdown of the data in the reports given to OAS technical experts by the TSE, it transpires that there was an established infrastructure of principal perimeter servers and their respective backup equipment. During the interviews conducted with technical personnel in the electoral tribunal and NEOTEC, no explanation was forthcoming about why, when the BO1 server stopped functioning, and perimeter servers were available in excellent working condition (according to the audit company's reports), the decision was taken to change the IP for 350 computers instead of using the servers provided for that purpose. This is a highly serious matter, in addition to it occurring right in the middle of an electoral process.

- **Main server (BO2) and backup server (BO3) do not have the same information**

According to the information provided by the TSE, there was a main server (BO2), a backup (BO2S), and a publication server (BO3). Curiously enough, the BO3 server was not used for publication as had been planned, and, using a bad practice, publication was carried out from the BO2 primary server. The OAS audit managed to ascertain in the end that the official publication server (BO3) did not have the same number of tally sheets as the principal server (BO2). In other words, they did not have the same information in their databases as one would expect from this process.

This difference, detected during the audit, was not noted in any reports. This is crucial, as BO3 was the official publication server, with no report indicating otherwise. This is the other grave irregularity detected.



Número departamento	D2	Departamento	Diputados	Electores Inscritos 7,315,364	Total mesas 34,555	Total actas 68,140	Actas registradas 67,400	% actas registradas 98.91	Actas no registradas 740	Actas verificadas 64,763	% actas verificadas 95.04	Actas no verificadas 3,377	Actas esperando aprobación 2,560	Total recibidas 0	% actas recibidas 0.00
1		Chuquisaca	5	370,680	1,828	3,656	3,560	97.37	96	3,527	96.47	129	19	0	0.00
2		La Paz	13	1,910,654	8,988	18,199	17,877	98.23	322	17,525	96.30	674	333	0	0.00
3		Cochabamba	8	1,325,896	6,134	12,268	12,268	100.00	0	11,714	95.48	554	544	0	0.00
4		Oruro	3	335,777	1,646	3,292	3,291	99.97							

Image of audit of BO2 primary TREP server showing the total number of tally sheets recorded

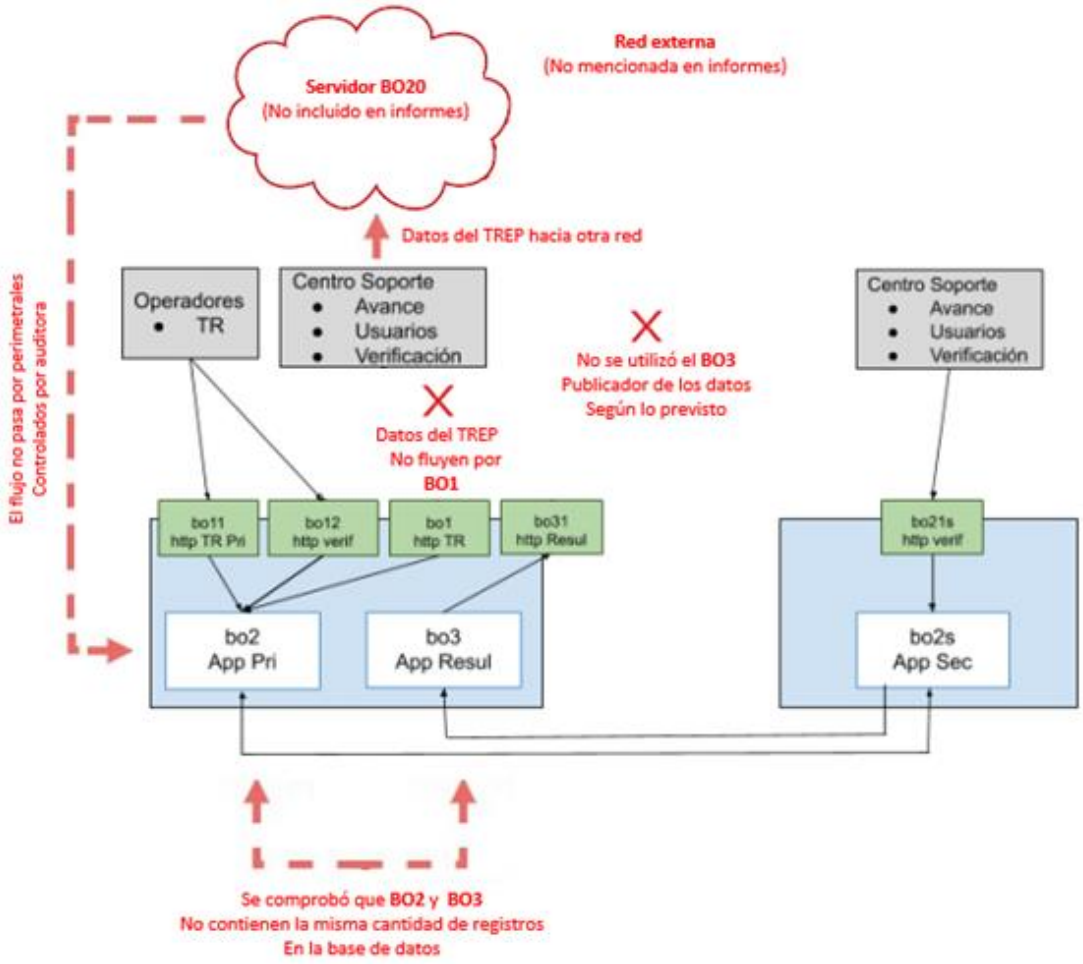
País	Número departamento	D2	Departamento	Diputados	Electores Inscritos 7,315,364	Total mesas 34,555	Total actas 68,140	Actas registradas 67,385	% actas registradas 98.89	Actas no registradas 755	Actas verificadas 60,934	% actas verificadas 89.42	Actas no verificadas 7,206	Actas esperando aprobación 3,176	Total recibidas 0
Bolivia	1		Chuquisaca	5	370,680	1,828	3,656	3,560	97.37	96	3,380	92.45	276	30	0
Bolivia	2		La Paz	13	1,910,654	8,988	18,199	17,877	98.23	322	16,617	91.31	1,582	654	0
Bolivia	3		Cochabamba	8	1,325,896	6,134	12,268	12,266	99.98	2	10,715	87.34	1,553	534	0
Bolivia	4		Oruro	3	335,777	1,646	3,292	3,290	99.94	2	3,148	95.63	144	110	0
Bolivia	5		Potosí	6	452,047	2,338	4,676	4,666							

Image of audit of BO3 TREP publication server showing the inconsistency in the total number of tally sheets recorded

The reports made initially by NEOTEC and the TSE and received by the OAS do not note the existence of this inconsistency anywhere. Given that this is the publication server, why does it have less data than what was published through the TREP? Following this discovery by the OAS audit team, NEOTEC submitted a supplementary report on November 4, 2019, to the TSE. This document acknowledges that server BO3 was not used to publish the data; rather, the BO2 primary server was used. It is noteworthy that such an important piece of information would be left out of the reports and only acknowledged after the discoveries of the audit team.

It is inexplicable that a (supposed) advisor to the TSE members responsible for the security of OEP information would not issue any report on it and allow the reports to lead to the assumption that the formal BO3 infrastructure was used, concealing this grave inconsistency between the BO2 and BO3 databases.

The following graphic shows the final network topology used after the manipulations:



This diagram shows the BO2 primary server and the publishing server (BO3) provided for in the design that do not have the same number of tally sheets.

- **There is no information on the TREP interruption incident**

There is no document with the life cycle of the incident relating to the interruption of the TREP that might effectively explain what happened and the root cause of it. Nor is there a detailed record of the persons who acted at that moment and the role they played (those attending the meetings mentioned someone who was an advisor to the TSE members who was apparently the person responsible for OEP information security, but that individual was not introduced to the audit team). The OAS audit team asked for documentation of the log (ACTA) and all those interviewed denied the existence of such documentation. It is reiterated that the aforementioned individual in charge of security did not submit any report to the OAS team.

- **The metadata of the TREP images was not kept**

The audit team found that the metadata of the images of the tally sheets received from cellphones were not kept, even though they are vital for transparency in a process of this nature. That is, no audit trail was generated to ensure the metadata was kept to facilitate verification of the origin of the images.

Metadata for all the images is vital for forensic analysis in order to determine image authenticity and identify the source from which the files were acquired.

Following this discovery by the OAS auditor, NEOTEC included an explanation in its supplementary report of November 4, 2019, on the function of the application that resulted in failure to preserve the EXIF information originally recorded with photographs.

Regarding this, if the image sent from the cellphones had to be rotated or edited for use by the application, the original image with its corresponding hash value should have been saved in a separate location.

Along with this, the application did not restrict the transmission of tally sheets to devices with the correct date. For that reason, tally sheets were received with dates that do not fall within the TREP life cycle. This led to numerous complaints and reports from citizens and research teams from a number of universities. Implementing this would have been simple and avoided this situation.

Not helping this was the impossibility of having the devices available to secure them, as their users were volunteers who registered solely to send the tally sheets.

- **The hash value was not recorded in the software freeze log, and later, changes were made to it in the middle of the electoral process**

According to OAS audit findings, no record was kept of the hash value in the software freeze log. This is bad practice, as it makes it impossible to validate the integrity of the software used in the process with the log.

On October 20, 2019 (when the TREP was in full swing), the first incident as a result of flaws in the software took place at 4:50 a.m. The software was changed and recompiled, violating all international standards and good practices guidelines.

Actualización simonel por bug Recibidos × TSE Bolivia 2019 ×

Marcel Guzmán de Rojas dom., 20 oct. 4:50
para mí

Alvaro,

tuvimos un bug. Puedes verificarlo en el log de Tomcat, pues tuvimos una excepción. Se modifican 3 líneas de código en VerificaProxima.java, ComputoProxima.java y SimonelProperty.java, 1 línea en cada java.

Instalamos una actualización: adjunto el war y la firma.

Saludos,

Marcel Guzmán de Rojas
NEOTEC Ltda
La Paz
Bolivia
EMail: marcel@neotec.cc

First change to the TREP software by NEOTEC on Sunday, October 20, 2019, at 4:50 a.m.

The second update took place that same morning on the day of October 20, 2019. Peculiarly, the change was only made to the server at IP address 10.100.88.24.

It is important to take a close look at this incident, as the malfunction reveals that the tally sheets from the overseas vote were not copied, which is how it was learned that they ended up being added to the official count. This is thus the first event involving tally sheets that ended up part of both the TREP and the final count.

2nda Actualización SIMOBOL Recibidos × TSE Bolivia 2019 ×

Marcel Guzmán de Rojas dom., 20 oct. 6:33
para mí

Alvaro,

la primera actualización se realizó en los servidores bo2 y bo2s.

La segunda actualización se realizó únicamente en el 10.100.88.24. Esta actualización corrige un bug en el que no se replican las imágenes que vienen del exterior. Todavía estoy probando la actualización, estoy esperando más imágenes del exterior.

Tuve que marcar las imágenes como no exportadas por SQL en el servidor.

Con history de bash y mysql pueden ver lo que hice.

Saludos,

Marcel Guzmán de Rojas
NEOTEC Ltda
La Paz
Bolivia
EMail: marcel@neotec.cc

Second change to the TREP software by NEOTEC on Sunday, October 20, 2019, at 7:20 a.m.

This latter incident triggered another one, as changes were made directly to the database using SQL commands (without going through the application), something that is absolutely unacceptable for an electoral process.

The description of this finding (which summarizes several events) will include the way in which the changes were made and the striking form of communication. After the changes were made to the source code, in addition to accessing the database using SQL commands (without the physical presence of SRECI, DNTIC, or audit company staff), notification was made by e-mail.

It is noted for the record that this runs contrary to good practices and impacts the process's transparency. Before 8:00 a.m. on October 20, three anomalies are known to have been spotted by NEOTEC.

In view of the fact that as changes were being made, tally sheets were already being received from the overseas vote, this means that although the electoral process was already in full swing, changes continued to be made and tests run (as described in the e-mail). This situation is totally out of the ordinary for an election day that has already started.

- **TREP images used for the official count**

Transfer of images were found from the TREP's primary server (BO2) on the Amazon cloud to the applications and publishing server with IP address 10.100.88.24, a physical server cluster located in San

Jorge and run by the DNTIC that feeds the official count. These images from the TREP (consisting of photographs of tally sheets) were added directly from the TREP to the official count. This is one of the elements where the lack of security and impossibility of guaranteeing the TREP's integrity has an impact on the official count.

This flatly dispels the argument that the TREP and the official count were two completely independent processes. It should be noted clearly that these tally sheets that were part of the TREP are the same ones that were added into the official count. This flow of information from the SERECI circulated until 7:40 p.m. through un undeclared, unsecure, and unmonitored server (BO1), and, following the recommencement of the TREP, through an undeclared outside Amazon network, omitted from the reports, that evaded the perimeter servers controlled by the audit company (BO20) for subsequent inclusion of the information into the official count.

As regards this link between the TREP and the official count, it is worth highlighting a statement from the audit company hired by the TSE: "Once all the critical vulnerabilities that we found in the TREP were reported, and despite NEOTEC's efforts to address them, immediately prior to the elections in a meeting in the plenary chamber, we warned that the software was not secure, but that with a portion of the critical vulnerabilities addressed, it should be decided whether to accept the risk and move forward with the elections or not."

- **Direct entry of tally sheets in the application**

In the TREP system, with regard to overseas voting, there are images of tally sheets added through the "Delayed Tally Sheets" functionality, from outside the planned circuit for sending images of tally sheets. The individual in charge of that functionality entered both the image of the tally sheet and the information from it.

The application enabled the direct addition of tally sheets without transmission from a mobile phone. In this case, they were added by a SERECI official. At the same time, to address the possibility of tally sheet images that were hard to read or images that were added by mistake, the TREP system offered the function of deleting an image.

- **SSH access to TREP servers by NEOTEC in the middle of the electoral process.**

Once the TREP process began, SSH access to its servers was logged, often later escalated to root privileges. It is striking that NEOTEC would be accessing servers during the process, without question evidence of a lack of planning that compromised the security of the process.

IP Origen	Usuario Conectado	IP destino	Nombre Agente
181.115.131.216	ec2-user	10.1.0.159	APPPrimarioTREP-Bo2
181.115.131.216	ec2-user	10.1.0.159	APPPrimarioTREP-Bo2
181.115.131.216	ec2-user	10.1.0.84	PerimetralSegundoResultados-Bo21
181.115.131.216	ec2-user	10.1.0.84	PerimetralSegundoResultados-Bo21
181.115.131.216	ec2-user	10.1.0.235	PerimetralResultTREP-Bo11
10.8.111.6	ec2-user	10.1.0.235	PerimetralResultTREP-Bo11
10.8.111.6	ec2-user	10.1.0.235	PerimetralResultTREP-Bo11
10.8.11.6	ec2-user	10.1.0.159	APPPrimarioTREP-Bo2
186.27.75.89	ec2-user	10.1.0.84	PerimetralSegundoResultados-Bo21

Some of the multiple instances of NEOTEC SSH access to TREP servers detected by Ethical Hacking

Ethical Hacking's report includes a statement clearly indicating that this aspect impacted the process's transparency. Regarding the changes, it states: "Pursuant to established protocol, all these accesses and changes should have been carried out in the presence of the DNTIC, and in our presence as the audit company. However, NEOTEC categorically refused to work with us at the OEP offices and went to the SERECI." The expert auditors explicitly noted this obviously anomalous situation for the record.

- **Other relevant findings**

- Database and NEOTEC application residuals were found in perimeter servers, which is contrary to best practice and poses an additional risk. It is important that perimeter servers not have databases or versions of the application used for the process.

- The TREP system was missing use cases, an indication of an absence of implementation methodology for critical systems. This, along with the incidents and actions that took place during the electoral process, amounts to a system that does not meet the necessary standards.

- In the TREP system, there were no test batches covering a wide range of expected possibilities—such as erroneous data—in order to minimize incidents and guarantee service availability.

- What little reporting there is indicates the simulations were insufficient, and no report is available on the results.

- In the TREP system, the "Approve Tally Sheets" function allowed validation of the tally sheets even in the event of different values between Pass 1 and Pass 2. This function makes it possible to continue processing tally sheets in spite of differences.

- The functionality called "TREP – Tally Sheet Verification with Image Erasing" allows erasing images linked to a tally sheet. The head of the TREP said it was used in cases in which the image sent was blurry and a new image was needed for inclusion in the system.

- The system provides a series of parameters, one of which—"Time to generate results, in seconds"—when set at "0" (zero), shows no results in the publisher. This parameter was used to halt the publisher on October 20, 2019.

b. Official count system

To process the official count of the tally sheets, as described in the elections law and performed by each of the nine Departmental Electoral Tribunals (TEDs), the tribunal used an application installed on each of the local TED computers.

This system processed the tally sheets using the originals that were filled out at each of the tables and sent physically to the TED, using security envelopes. The process began with the scanning of the tally sheets to be saved digitally. The scans were then sent to the Plenary Chamber of each TED for examination and approval. The approved tally sheets had to be digitized and verified by visually reviewing the scans. All the data from this review was to be consolidated and published immediately on the results publication webpage. In this process, the OEP decided to again publish on the Internet all the scanned images and validated data from the tally sheets, as well as flat files with the results of the count, for viewing by the political parties and the general public.

The system's operations were centralized on the OEP's main data center servers, located in La Paz, which communicated with all the TEDs through a private network contracted by the TSE. For publishing the results processed through the system, the TSE contracted an external cloud service to ensure significant capacity to handle traffic from the public.

The OEP expected the system's processing of the tally sheet data to begin two hours after the close of voting at the electoral tables and estimated that it could take one to two days, due to the time it took to physically transport the tally sheets from polling stations that were, in some cases, extremely remote.

- **Connection between the TREP and the official count**

Because some of the voters participating in these general elections were located outside Bolivia, for them to be able to vote in the presidential election, proposed operators overseas were given instructions on using the TREP mobile application.

Because it would take time for the physical tally sheets to reach Bolivia, the decision was made to send the images from overseas through the TREP system to the official count. This meant that votes from overseas were entered into the official count based on tally sheets received through the TREP system. This method was repeated for certain tables located in the country after tally sheets were burned in Chuquisaca, Potosí, and Santa Cruz.

- **Immaturity of the process with regard to the software**

The process was immature, as far as the software was concerned: First, due to a lack of use cases and various software tests (unit test, integration test, and regression test); and second, because the tests conducted lacked a formal process for accepting software using formal case tests.

- **Weak authentication**

Authentication for software use was weak, allowing someone to take control and perform administrator functions, due to:

- Deficient implementation of the multi-factor authentication function (several sessions can be opened using the same code).

- A new tab could be opened in the navigator before closing the previous one (without authentication).

- When the previous person working withdrew, even when he or she had closed the application, it was possible to gain access with her or his user name without authentication (even to roles permitting validation of tally sheets).

These vulnerabilities were confirmed in the presence of the technical personnel in charge from SERECI, NEOTEC, and the DNTIC, as well as the TSE official designated to work with the OAS audit.

It should be recalled that Ethical Hacking determined that other vulnerabilities detected could not be remedied before the election, which without question increased the risk of takeover with the possibility of data manipulation.

– **The database reset to zero value procedure did not follow basic security requirements.**

Although a formal deletion procedure was conducted, later on, the head of the company gained unrestricted access to the databases. Also, when the single database was already in zero, a new deletion was performed from Departmental Electoral Tribunals (TEDs).

Root access to the operating system by the head of NEOTEC greatly impacts the transparency that was supposed to be guaranteed with the official act of resetting the database to zero value in the presence of the electoral authorities.

It is extremely serious that the head of the company providing the software used the root user to access the operating system in the middle of the night (on his own initiative), after everyone thought that the systems were ready and that nobody could access them.

The root user of the operating system has the ability to make any and all changes, for which reason such access is flatly prohibited during an electoral process.

– **Software integrity safeguarded prior to the start of the process was ignored.**

The software was frozen during the process, but the log does not include the hash values. Prior to this, the software was recompiled in the middle of the process, thus losing integrity. Because the production environment was entered without acceptance controls, case tests, or authorization, this change violated the essential principles of security.

All international standards and good practices are categorical in holding that the three environments (development, testing, and production) must be respected, but they also indicate that software must not be changed in the middle of an election.

In this case, the head of NEOTEC changed the official count software more than once in the middle of the process; recompiled it (at which time it lost integrity in terms of what was saved during the freeze);

and put it in production. A significant amount of research has established that this is bad practice that is unacceptable in an electoral process.

This confirms the negative effect of the lack of use cases, software testing, and acceptance tests, as previously described, all of which without question impacts the transparency of the process.

- **Existence of residual data**

A sterile environment was not provided for the start of the process. The TED computers in La Paz were seen to have test data (for example, tally sheets) mixed with tally sheets from the day of the election. The confirmation was performed in the presence of the individual in charge of the TED systems, the TED members present, and the coordinators appointed by the TSE to work with the audit team.

Failure to remove this test data contaminates the production environment. Good practices for managing electoral processes are clear on this point, stating that there can be no residual test data left at the time a process commences.

- **Addition of TREP tally sheets to the official count**

As described above, TREP tally sheets (in a setting in which the network was breached and manipulated) were included in the Official Count. From a server in a breached network (the TREP BO2 server), contact was made with the official count network in order to transfer data.

At least 1,575 TREP tally sheets were included (directly) in the official count. There are no scans for these tally sheets—only photographs, and this total only includes the tally sheets added to the official count from the TREP.

- **Failure to adequately preserve evidence on the election**

To this day, the provider and principal actor involved in an investigation into incidents in a disputed election are in absolute possession of the data and nobody else can access them without their authorization. This is contrary to best practices in the handling of incidents and violates the chain of custody

Thus, there is no official preservation of election data that could later be the subject of judicial proceedings. Additionally, the apps used to access databases by persons operating from Bolivia suffer from the authentication shortcomings described earlier (assumption of an administrator function, including without need for authentication in certain circumstances, as described and proven).

- **Flaw in the calculation algorithm**

There was a flaw in a calculation algorithm, revealing a lack of testing. The flaw's effects include that it could cause an incomplete tally sheet. That flaw could not be corrected using the app. The head of the company had to be given unrestricted (superuser) access (through SQL commands) to solve the problem. That poses a high risk for data integrity.

Access through SQL commands, as well as possession of the password and root access to the official count by the same individual at NEOTEC (with no physical control by DNTIC staff), violates good practices and is evidence of the lack of information security surrounding the process.

Through this access alone from the flaw in the algorithm, which took place 20 minutes after direct access to the databases to "reverse the annulment of tally sheets," the data from 41 tables was changed directly in the database.

The team of audit experts noted explicitly for the record this series of events compromising data integrity.

- **Direct access to the database provided without going through the app**

As indicated in the prior point, during the official count process, direct access was given to modify data in the database via SQL commands (which allow data to be changed without using the app). This is unacceptable in an electoral process and jeopardizes data integrity.

One of the reasons that form of access was granted was (as officials put it) to reverse the annulment of tally sheets; the other was to repair an unaddressed flaw in the application, as described previously.

The application must be the only means of accessing data during the electoral process in order to guarantee its integrity.

- **Interruption to the publication of the official count**

According to NEOTEC's report, on October 24, 2019, at 1:33 p.m. (Bolivia time), a denial of service attack began on the server publishing the official results, http://computo.oep.org.bo. The attack lasted 16 hours and intensified during the final six hours, slowing the presentation of the results and causing errors in Excel file downloads.

The following image included in the aforementioned report shows that the attack was only against the count site (orange points on the graph). Traffic to the TREP site (blue points on the graph) was normal.

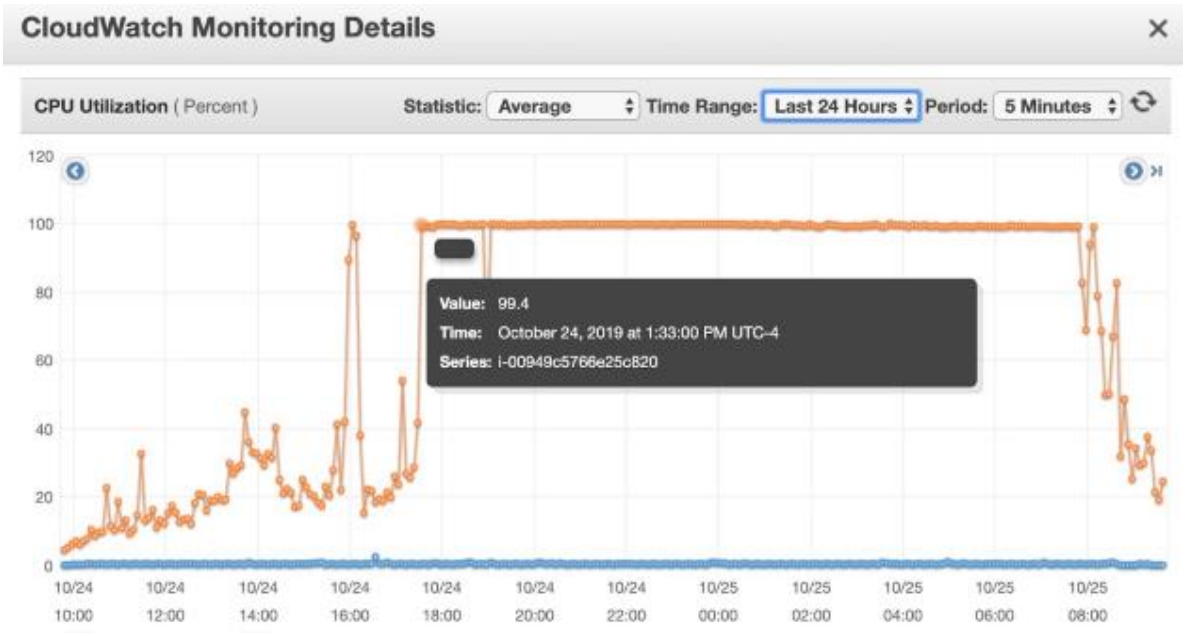


Image from the period during the denial of service attack, provided by NEOTEC

The report included a screen shot showing an attacker making more than 500,000 requests in one hour.

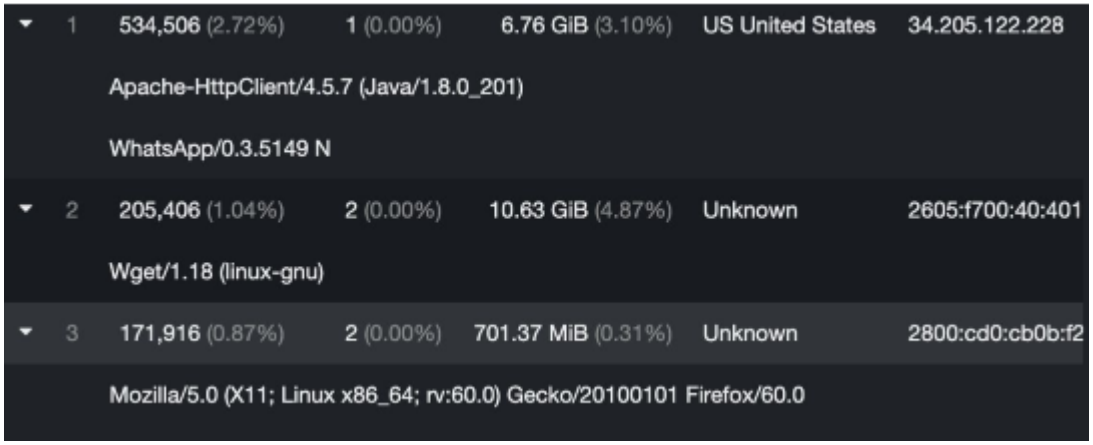


Image showing the volume of requests, provided by NEOTEC

Additionally, on October 25, 2019, at approximately 6:00 a.m., a second massive attack on the official count's results publication server began and lasted until approximately 12:00 a.m.

It should be noted that the servers never went down and that the other non-publication processes functioned normally, in contrast to the TREP, where processing was intentionally interrupted.

Numerous public complaints were submitted alleging inconsistencies between what was displayed on the website and the data in the Excel file download. These discrepancies were explained by the company as the result of delays caused by the attack, without further details.

The security strategy in this area consisted of protecting both the TREP results servers and the official count servers with the CloudFlare DoS attack mitigation service.

For a major event like a presidential election, publication of the results cannot be protected only by hiring a service. Rather, a robust defense strategy is needed with a variety of backup plans. It is never acceptable for a denial of service attack to affect a website like this for such a long period of time. It affects the availability of the information and leads to uncertainty among the general public.

- **Release of software held by NEOTEC.**

The software acquired by the electoral body is being held by the supplier company. Added to this, there are no procedures for software acceptance testing and release, leaving it up to NEOTEC's discretion.

In the official count process (as in the TREP process), it was demonstrated that NEOTEC changed the software, recompiled it, and released it without consultation, to the point that it unilaterally accepted the risk of not resolving a flaw and addressing it with SQL commands executed on the database.

The facts described in this section negatively impact the electoral process by calling into question the integrity of the results, impacting transparency, and increasing risk.

- **Inclusion of disqualified voters on reference voters roll**

The system used for the official count has a feature for checking a voting table tally sheet using the number of a voter's identification document. To execute this check, it must have the voters roll in its database.

The TSE provided NEOTEC with a .csv file that included both those qualified to vote and those disqualified, with a status marker to indicate which ones were qualified.

When importing the database, the company only included the "documentocompleto" and "nummesa" columns, thus including all the disqualified voters as well. In addition to being bad practice, the issue led to significant mistrust by the electorate and the general public, which also spotted it in the TREP.

Citizens took screenshots of queries showing this situation, generating countless reports received by the OAS audit team.

It is unacceptable to include disqualified voters in the database. It is striking that the list would be delivered to the company this way, with voting table numbers assigned as well. Those not qualified to vote should not be included in an electoral process. Once again, this is evidence of a lack of proper testing.

- **Other findings**

- A single individual (the person in charge from the software provider) performed the following functions:
    - Designing, developing, testing, and implementing the software.
    - And during the process, he:
        - Recompiled the software;
        - Did not apply change management, testing, or security procedures;
        - Accessed the database with superuser privileges to change the data;
        - Kept the servers, databases, and application under his exclusive control.
        - Therefore, the chain of custody was broken following the incident.
- The audit company did not monitor data integrity.
- An operational, uncoordinated exercise was conducted, of which the tech designees from each TED were in charge.
- The test batches used were up to the discretion of the head of each TED, no test cases were generated, and the diversity of the cases tested was limited; thus, the full range of possible situations that could arise during the election process was not considered.
- The provider of the app gained direct remote access to the server. Virtual private networks (VPN) were allowed access to official count servers.

- **Final considerations**

It should be emphasized that neither the reports from NEOTEC nor from Ethical Hacking turned over to the audit by the TSE detailed:

- The actual configuration of the BO1 server (implemented on a NEOTEC Amazon network and detected by the audit company). In addition to being a gateway between the user and the server, as

stated by NEOTEC, it responded to other web requests—as can be viewed in its logs—and stored elections databases and applications (unjustifiable for a perimeter server during an election);

- The existence of server BO20 (implemented on an outside Amazon network) discovered by the OAS expert auditors during the audit.

- Inconsistencies were found between the databases on the BO3 publication server and the BO2 primary server.

During a meeting held by the OAS audit team with the TSE members and representatives of the TEDs, the president of the OEP stated that Ethical Hacking had concluded that the elections had been transparent and that there had been no integrity problems.

After the OAS experts had made their findings, the audit team contacted the CEO of Ethical Hacking to describe the numerous irregularities detected. The individual in charge there provided reports showing multiple changes to the database and events that made it impossible to guarantee the integrity of the process. The actual conclusion of this company (contracted by the tribunal itself) is diametrically opposed to the version offered to the audit team by the president of the plenary chamber.

For its part, the NEOTEC report dated October 28, 2019, and turned over to the audit team by the TSE does not identify the anomalies later discovered by the expert auditors. Following these discoveries, NEOTEC prepared a supplementary report dated November 4 that not only confirmed that BO1 (not provided for in the formal topology) should not have been used, but for the first time described the existence of server BO20 (hidden in the network topology), recognized the differences between the BO2 and BO3 tally sheets (which constitutes a grave inconsistency that was omitted in prior reports), and provided an explanation for including those disqualified to vote in the voters roll for TREP and official count queries.

It is suspicious that the TREP's dataflow would be redirected to servers that were hidden in the network topology. The OAS audit team was able to confirm that the outside network housing BO20—detected during the audit—did not belong to the TREP or to the official count. The network did not perform daily computing tasks, nor are operational OEP servers located on it. It was described verbally by DNTIC officials as a network used to do testing unrelated to the electoral process. No one can justify the decision to implement a server there for redirecting the flow from the TREP—thus evading all controls from the audit company—or the reasons for hiding it from the audit company.

Recurring mention has been made of the role played by an "advisor" to the plenary chamber of the TSE, an I.T. professional who was not introduced to the team of OAS auditors but who supposedly played an important role during the interruption of the TREP and related events, and who could shed light on the motives for diverting the flow of SERECI data to a network outside the TREP and the official count (avoiding the perimeter servers of the audit company), something that was not addressed in the reports delivered to the OAS audit team at the beginning of the audit.

On November 11, 2019, DNTIC officials submitted a report[12] acknowledging the creation of a Linux AMI virtual machine on an Amazon network, detected by the OAS expert auditors, with IP address

[12] Annex 3 – Report No. DNTIC-EXT N° 0345/2019

18.220.48.51, that had not been described in the reports initially delivered to the audit team and had been hidden in the network topology used for the TREP. They stated that they did so on October 21, 2019, at the request of TSE members, in coordination with NEOTEC, and with the participation of the professional described by authorities as an advisor to the TSE members, an individual who they identified by his full name, but only on this occasion.

No specific security measures were implemented on that server aimed at guaranteeing protection of the logs, integrity control, or recruitment or any control by Ethical Hacking. The aforementioned document does not include any explanation as to the reason for redirecting the TREP flow to an outside network, although the document recognizes that the advisor to the TSE members functionally operated with the authority over the DNTIC during the electoral process

The document states that the Linux AMI virtual machine on the Amazon account was created on October 21, and from the creation of server BO20 to the request by the OAS audit to verify logs, no additional access was reported. However, these statements were false. The audit team found that the virtual machine had been implemented prior to the day of the election. Thus, server BO20 was configured using a machine created prior to the vote. The auditors also confirmed that server BO20 had access at 12:23 on October 21, 2019.

It was confirmed and the audit team has logs showing that user ec2-user accessed (also escalated to root privileges) the machine several hours after it was configured and in the middle of TREP execution, in its second stage (after the freeze).

It is recommended that an in-depth investigation be conducted into server BO20 and the other of the TREP and final count infrastructure. However, it should be noted for the record that the evidence was not preserved, and a trustworthy chain of custody was not established. This latter factor will be an obstacle to any later legal investigation.

- **Conclusions**

In light of the background and findings described above and the accumulation of irregularities observed, it is not possible for the audit team to guarantee the integrity of the data and ascertain the results.

The evidence must be safeguarded, especially the evidence kept in highly volatile environments, and an adequate chain of custody must be established to guarantee investigation into the facts. That investigation can chronologically review the documents provided by the companies and the TSE to the audit team from the start of the auditing activities and confirm the differences between the information initially provided and the later reports submitted after the findings of the OAS audit experts.

It is important to mention that most of the findings of the present section are listed in a series of proceedings / minutes drawn up by the audit team, which were undersigned by the technical staff of the TSE.[13] These proceedings can be consulted in Annex 6, in which the names have been deleted to

[13] Annex 6 – Proceedings / Minutes with the findings on IT aspects.

safeguard personal data and the identity of those involved. Nevertheless, the complete documents have been handed over to the Attorney General's Office.

The audit team also deems it appropriate to include the conclusions of the audit firm Ethical Hacking hired by the TSE itself. Although its reports do not include findings such as the difference between the database of the BO2 and that of the publisher, as well as the server hidden in the network on the BO20 cloud, it is important to assess and document them:

> *"Bearing witness to the truth, professional ethics, and our commitment to the transparency of the information in the conduction of the present work, I can clearly and convincingly certify that:*
>
> *1. All information provided in the present report is real, has not sustained any alteration, and has been drawn up following a scientific methodology, respecting all aspects concerning IT security and tamper-proof audit procedures.*
>
> *2. The present report only accounts for a consolidated statement for the timeline from the start of our participation with the TSE and the OEP for the presidential elections of Bolivia in 2019. All technical reports have already been handed over to the receiving and evaluating committee within the time-limits stipulated in our contract.*
>
> *3. After being informed of all the critical vulnerabilities that we encountered in the TREP and despite the efforts made by NEOTEC to remedy them, just before the elections at a plenary meeting, we did our duty by warning that the software was not secure, and that even with a pportionof the critical vulnerabilities rectified it was a risk they needed to assess in order to decide whether or not to accept it and carry out the elections.*
>
> *4. As for the recommendations and rectifications that we passed on to NEOTEC for implementation in the TREP and the Final Count System, they were only applicable to the TREP, and even then not 100%, because there was very little time to remedy certain things, according to NEOTIEC .*
>
> *5. As for the source code, we conducted an exhaustive audit of the static code, especially in the routines and functions where the data are entered, along with their processing to certify that the software does not engage in fraudulent operations and that the data entered are managed safely and adequately, including the first time the integrity hash was created in front of the plenary meeting and the OAS observers. After that date, the source code underwent various alterations on various dates, in which we did not participate and therefore we can no longer certify the integrity of that software.*
>
> *6. As for the outage of the TREP, although it was concluded that it was a protocol omission error and that the change should not have been made without authorization, it is clear that that server was not within our range of monitoring, and when redirecting all the dataflow of the SERECI to check the tally sheets, a very important and delicate task for an extraneous server that was completely outside the monitoring range, we cannot certify all the information that was entered at that time, and when the security protocol is breached the electoral process loses all credibility.*
>
> *7. Because we have no records of the information transmitted from a server extraneous to our monitoring, we cannot certify the integrity of the data recorded during the spike that triggered the*

alert because it is almost impossible for more than 30,000 petitions to arrive every 30 seconds from the SERECI with a group of 350 operators "uploading 2 tally sheets per minute" as indicated by Marcel Guzmán de Rojas.

8. As for the flaw in the TREP calculation algorithm that NEOTEC calls the "flat computado," because it is an error identified from its algorithm, which they mentioned has been occurring in all the elections (for more than 4 years), it shows us that the TREP is a fallible system and contains programming errors that should have been solved long ago. These errors require having access to the production database during the implementation of the elections and making manual changes, which subsequently constitutes a breach of integrity.

9. As for the manual alteration of the TREP and ballot count databases during the voting, regardless of the reasons from a technical and forensic standpoint, it renders the entire electoral process null and void, and all credibility is lost because of the breach of the integrity of the databases.

10. As for inconsistencies with the data of the tally sheets which, at certain times, provided one set of information and at other times a different one, which were observed by the OEP itself, and because of the number of direct changes to the databases without any supervision from the DNTIC or our firm, we cannot certify the integrity of the information that currently is in the backups handed over by NEOTEC.

11. Because of all of this and bearing witness to the truth that, after all the facts exposed in the present document and in all of our technical reports submitted while we were carrying out our work, we cannot certify the integrity of the electoral results because the entire process is rendered null and void owing to the number of alterations to the TREP's source code, the number of manual accesses and modifications and with maximum data-changing privileges for accessing the databases, and the inconsistencies that were appearing between the TREP and the Final Count System during the election."[14]

II. FINDING 2: A PATTERN OF MANIPULATION, FORGERIES AND ALTERATIONS OF THE BALLOTS CAST IN SIX DEPARTMENTS, ALL AIMED AT BENEFITING THE SAME CANDIDATE

The OAS audit team conducted handwriting analysis to identify and analyze possible manipulations of the ballot count and tally sheets of Bolivia's 2019 general elections.

The auditors detected various alterations, forgeries, and manipulations in the filling out of said sheets. The actions that were identified breach Bolivia's electoral law and undermines the integrity of a large percentage of the ballot count and tally sheets reviewed.

Samples

An expert study of a sampling of **4,692 tally sheets in digital format** was conducted, on the basis of the correlative voting tables of the following universes of study:

[14] Consolidated Report of Output 1 and Output 2 Timeline of the Consulting Service to OEP, Ethical Hacking, November 6, 2019.

- Tally sheets where the MAS political party secured 90% or more of the votes.[15]
- Tally sheets processed in the official count after interruption of the TREP, where the MAS party secured more than 99% of the votes.
- Tally sheets entered directly into the official count, which were not included in the TREP, where the MAS political party secured the equivalent of, or more than, 77% of the votes.[16]

– **Tally sheets filled in by one and the same person**

Technical expertise made it possible to identify tally sheets from different voting tables filled in by one and the same person. As indicated in the technical annex,[17] 226 tally sheets out of the 4,692 reviewed were observed to include 2 or more tally sheets from the same polling station filled in by one and the same person, which points to irregularities that are of interest to the experts and a breach of the attributions of the sworn polling staff of the voting tables. According to Article 64 of Law No. 018 of the Plurinational Electoral Organ, the sworn staff of the voting table is in charge of "conducting the opening and closing actions of the Voting Table, examining and counting the ballots, and completing the respective tally sheet."

This situation points to a highly irregular procedure from the electoral standpoint. The tally sheets referred to pertain to 86 polling stations from 47 municipalities of the country. As a whole, all of these voting tables account for 38,001 valid ballots, of which the MAS political party secured 91% of the votes; that is, 34,718 votes, almost the number of votes making it possible for Morales to avoid a second round.[18] The above only takes into account a review of 13.5% of the voting tables. On the basis of the pattern found, a review encompassing a larger percentage of tally sheets would no doubt detect a higher number of forged, altered, or manipulated tally sheets.

Department	Province	Municipality	Voting tables
Potosí	Alonso de Ibañez	Sacaca	51546, 51547, 51548
	Alonso de Ibañez	Sacaca	51549, 51550
	Alonso de Ibañez	Sacaca	51541, 51542, 51543
	Alonso de Ibañez	Sacaca	51544, 51545
	Alonso de Ibañez	Sacaca	51564, 51565, 51566
	Tomás Frías	Tinguipaya	50691, 50693, 50694
	Tomás Frías	Tinguipaya	50689, 50690
	Tomás Frías	Tinguipaya	50717, 50718
	Tomás Frías	Tinguipaya	50719, 50720
	Charcas	Toro	51429, 51430, 51431
	Modesto Omiste	Villazón	52307, 52308
	Charcas	San Pedro	51391, 51392

[15] The MAS political party won more than 90% of the votes at 1,483 voting tables, compared to 14 voting tables for the CC political party. At 81 voting tables, the governing party won 100% of the votes.
[16] This percentage was defined taking into account the time available to carry out the expertise.
[17] Annex 8 – Findings of the handwriting expertise.

[18] The margin of victory of Morales in the first round amounted to about 40,000 votes. Without them, the difference with Mesa would have been lower than 10% and therefore a second round would have been required.

	Chayanta	Colquechaca	51174, 51175
Cochabamba	Arque	Arque	32768, 32769
	Arque	Arque	32778, 32779
	Ayopaya	Ayopaya	32513, 32514
	Ayopaya	Ayopaya	32476, 32477
	Ayopaya	Morochata	32527, 32528, 32529
	Mizque	Raqaypampa	35777, 35778
	Ayopaya	Cocapata	32555, 32556, 32557
	Ayopaya	Cocapata	32565, 32566, 32567, 32568
	Arque	Tacopaya	32804, 32805, 32806
	Arque	Tacopaya	32795, 32796
	Tapacarí	Tapacarí	35235, 35236
	Tapacarí	Tapacarí	35176, 35177, 35178, 35179, 35180, 35181, 35183
	Tapacarí	Tapacarí	35184, 35185, 35186
	Tapacarí	Tapacarí	35207, 35208
	Tapacarí	Tapacarí	35230, 35231
	Arani	Vacas	32758, 32759
	Arani	Vacas	32752, 32754, 32755
	Campero	Aiquile	32422, 32423
	Esteban Arze	Ansaldo	32633, 32634, 32635, 32636
	Capinota	Capinota	32861, 32862
	Quillacollo	Vinto	34068, 34069
	Chapare	Sacaba	34888, 34889
	Chapare	Colomi	34924. 34926
	Chapare	Villa Tunari	35010, 35012, 35014
	Chapare	Villa Tunari	35016, 35017, 35018, 35019, 35020
	Chapare	Villa Tunari	35110, 35111, 35112
	Chapare	Villa Tunari	35118, 35119, 35121
	Chapare	Villa Tunari	35135, 35136, 35137
	Carrasco	Puerto Villaroel	35441, 35442, 35443, 35445, 35446
	Carrasco	Puerto Villaroel	35447, 35448
	Carrasco	Puerto Villaroel	35499,35500, 35501, 35504, 35505
	Carrasco	Puerto Villaroel	35529, 35531
	Carrasco	Puerto Villaroel	35567, 35570
	Carrasco	Entre Ríos	35596, 35597
	Carrasco	Entre Ríos	35687, 35688
	Carrasco	Totora	35723, 35724
	Carrasco	Pojo	35296, 35297
	Mizque	Mizque	35727, 35728, 35729
	Mizque	Mizque	35736, 35737

	Mizque	Mizque	35741, 35742
	Mizque	Mizque	35743, 35744, 35745
	Mizque	Vila Vila	35748, 35751
	Mizque	Alalay	35760, 35761
	Mizque	Raqaypampa	35765, 35766
	Mizque	Raqaypampa	35781, 35782
	Punata	Punata	35787, 35788, 35789
	Punata	Villa Rivero	35920, 35921, 35922, 35923
	Tiraque	Tiraque	36051, 36052
	Tiraque	Tiraque	36055, 36056
	Tiraque	Tiraque	36057, 36058
	Tiraque	Shinahota	36120, 36121
	Tiraque	Shinahota	36104, 36105, 36106, 36107, 36108
Chuquisaca	Luis Calvo	Villa Vaca Guzmán	11777, 11778
	Azurduy	Azurduy	11105, 11106, 11107
	Yamparaez	Yamparaez	11480, 11481
	Nor Cinti	San Lucas	11588, 11589
	Nor Cinti	San Lucas	11600, 11601
	Nor Cinti	Incahuasi	11623, 11624
	Nor Cinti	Incahuasi	11631, 11632
	Zudañez	Villa Ricargo Mugia	11210, 11211
Santa Cruz	Velasco	San Ignacio	76161, 76162
	Velasco	San Ignacio	76180, 76181
	Ichilo	Yapacani	76468, 76469
	Ichilo	Yapacani	76474, 76478, 76479
La Paz	Inquisivi	Inquisivi	27602, 27603
	Inquisivi	Inquisivi	27609, 27610, 27611
	Caranavi	Caranavi	28942, 28943, 28944, 28946, 28947, 28948
	Camacho	Mocomoco	26652, 26653
	Ingavi	Viacha	27224, 27225, 27226, 27227
	Loayza	Sapahaqui	27514, 27515
	Inquisivi	Inquisivi	27613, 27614
	Inquisivi	Inquisivi	27623, 27624
	Aroma	Patacamaya	28463, 28464, 28465
Oruro	Cercado	Oruro	40898, 40899
	Abaroa	Challapata	41215, 41216

- **Comparison with photocopies, worksheets, and voter rolls**

The irregularities that have been pointed out are systematically repeated in the localities of Potosí, Chuquisaca, Santa Cruz, and Cochabamba, with the peculiarity that most of them were not audited by authorities from political parties other than the current governing party. In view of this, the paper

version of the tally sheets were sought to undertake a more detailed study of some of the tally sheets and to cross-check information with photocopies, worksheets, and voter rolls.

The audit team was unable to conduct a thorough review and undertake additional cross-checking because part of the electoral materials from the departments of Potosí, Chuquisaca, and Santa Cruz had been burned. But it was possible to secure and review original materials from the department of Cochabamba.

It was possible to observe cases where the signatures of the sworn polling staff in the original tally sheet do not match the signatures appearing on the photocopy. Although they were signed by the same person, they were written down at different times, making it possible to conclude that there were two original signatures, as in the cases of tally sheets Nos. 35036, 35034, and 34124. Furthermore, in the case of the former, when matching (analytical confrontation) the signatures of the polling staff in the above-mentioned tally sheet, with the signatures attributed to them on the worksheets of the delegates and chairperson, it is observed that the signatures of the six polling staff members on the worksheets had been forged, as substantiated in the annex to the present expert report. In another case, regarding tally sheet No. 35810, when comparing the signatures of the polling staff present at the beginning and closing of the voting with the signatures of the same persons on the voter roll, it was observed that the signature of one of the polling staff members does not match the personal signature written in his or her own hand located on the roll, consisting in this case of two lines in the shape of an "x."

For the purpose of expanding the field of study, the universe of electoral tally sheets from abroad were screened, choosing those where a political party secured 90% or more of the votes. This led to the identification of 115 tally sheets that were for the governing party at that scale, of which 113 came from Argentina, one from India, and one from Iran.

On November 6, at the Electoral Tribunal of La Paz, the team proceeded to examine the tally sheets from the province of Buenos Aires, Argentina, which had high numbers of voters favoring the current governing party, for the purpose of then comparing them with the eligible voter cards, copies, and worksheets. The study was based on tally sheets Nos. 1274, 1469, 1457, 1305, 1398, 1288, 1382, 1493, 1441, 1383, 1314, 1392, 1455, 1381, 1462, 1446, and 1389. It was observed, however, that neither the copies of the tally sheets nor the worksheets were available for examination.

It was possible to check the signatures of the polling staff inserted in the original tally sheets against the signatures of the same staff on the eligible voter cards. In the case of tally sheet 1305, it was observed that the signature and fingerprint pertaining to a member of the polling staff did not match the personal signature in his or her own handwriting on the voter roll, while the signature attributed to that polling staff member was in the same handwriting as that of another member of the polling staff.

- **Conclusions and findings**

The review conducted by the OAS audit team made it possible to identify a pattern of manipulations, forgeries, and alterations in the completion of the electoral tally sheets, using very similar mechanisms in six different departments and for the benefit of one single candidate. In other words, there was one

identical behavior repeated in various departments aimed at favoring the same candidate, as specified below:

- Of the 4,692 tally sheets in digital format reviewed by the experts, 226 tally sheets (as detailed in the technical annex) were found by the experts to have irregularities in the localities of Chuquisaca, Potosí, Santa Cruz, Cochabamba, La Paz, and Oruro.

They involve cases where there is the same handwriting; that is, one person filling in part of the contents of the electoral tally sheets from different voting tables of one single polling station. In addition, many of these tally sheets have the peculiarity of recording a percentage close to 100% of the votes for the governing party.

These findings raise serious doubts about the ballots cast at these voting tables, of which 34,718 votes were counted for MAS. This figure is virtually equivalent to the number of votes that made it possible for Morales to avoid a second round.[19] These findings stem from the review of only 13.5% of the voting tables. It therefore follows that a review of 100% of the tally sheets would yield a higher number of irregularities.

- The signatures of the sworn polling staff inserted in original tally sheets Nos. 35036, 35034, and 34124 do not match the respective photocopies.

It is worth stressing that the original tally sheets and the copies were written at different times. It is noted that, in this field of study, there was not enough material for comparison, because the copies of the tally sheets in question from the localities of Chuquisaca, Santa Cruz, and Potosí, had been burned. Likewise, the Electoral Tribunal, without specifying the reason, did not facilitate access to the copies from 11 voting tables being questioned in the locality of Cochabamba.

- The signatures of the sworn polling staff inserted in tally sheet No. 35036 do not match the personal handwriting of the signatures attributed to them, and inserted on the worksheets for the election of the president and congresspersons. Because of this, it is concluded that, at least in the latter case, they were forged.
- The signature inserted onto the voter roll of the eligible voter card from voting table No. 35180, in the box corresponding to one of the sworn polling staff members, does not match the signatures inserted on the electoral tally sheet and worksheets of the voting table attributed to that person.
- The signature inserted onto the voter roll of voting table No. 1305, in the box corresponding to one of sworn polling staff members, does not correspond to the signatures inserted onto the original tally sheet attributed to that person. Said signature was written by the same hand of the person who signed for other sworn polling staff members.

[19] The margin of victory of Morales in the first round amounted to about 40,000 votes. Without them, the difference with Mesa would have amounted to less than 10% and therefore a second round would have been required.

III. FINDING 3: A DEFICIENT CHAIN OF CUSTODY DOES NOT GUARANTEE THAT THE ELECTORAL MATERIALS HAVE NOT BEEN MANIPULATED AND/OR REPLACED

For the review of the comprehensive electoral materials custody plan, there were 18 experts from 13 different countries, who were deployed in the departments of Beni, Cochabamba, Pando, Tarija, and La Paz. In addition, a specialized team focused on examining the voting process abroad for these elections.

Despite the efforts of the OAS, the audit team was unable to travel to the departments of Chuquisaca, Oruro, Potosí, and Santa Cruz because of difficulties of access to the roads leading to these destinations, the security conditions in the departments and/or the Departmental Electoral Tribunals, and the clashes between the opposition and the police force.

The methodology used to gather data and subsequent review of the custody of electoral materials (tally sheets, ballots, voter rolls) to which the audit team had access was as follows:

- Interviews conducted with those responsible for the TED areas involved in obtaining information on the logistics of the electoral process, relative to the preparation, integration, delivery, deployment, and retrieval of electoral materials.
- Interviews with members of the police force involved in the Electoral Materials Custody Plan.
- Onsite visits to review the stockrooms or places where the electoral materials were kept.
- Review and comparison of sensitive material used on election day (original tally sheet, eligible voter roll, and worksheet).
- Review of documentation delivered by the Plurinational Electoral Organ and the Departmental Electoral Tribunals.
- Review of information from other entities involved in the Chain of Custody.
- Review of the complaints filed with the members of the OAS audit team.

– **Electoral Materials**

The Supreme Electoral Tribunal (TSE) approved the Regulations on Electoral Materials by means of Resolution TSE-RSP-ADM-No 0229/2019, which provides that the office responsible for programming, designing, requesting, and producing electoral materials is the National Electoral Processes Department.[20]

These regulations also indicate that the National Electoral Processes Department shall determine and propose to the Supreme Electoral Tribunal in plenary the design and contents of the electoral tally sheet, among other official election documents. The electoral materials (tally sheets and ballots) were printed by private-sector enterprises according to information provided[21] by the electoral organ.

In accordance with Report DNTIC-INT No. 0318/2019,[22] the electoral cases contained 46 differernt supplies, including; the ballot box; the polling station identification sign; pens, ballot count and tally

[20] Report of the OEP DNTIC- INT No. 0318/2019, pages 3 and 4, Table 1.
[21] Contract TSE-DNJ-SG-EG No. 009/2019.
[22] Report of OEP DNTIC- INT No. 0318/2019, page 2, Figure 1.1.

sheets; proof of vote certificates; eligible voter roll and non-eligible voter roll; receipt for delivery of electoral materials to polling staff; envelopes A, B, and C; and ballots, among others. The technical specifications and security measures of the electoral documents are described in the Document of Technical Specifications for Electoral Materials, which was shared with the audit team by the Plurinational Electoral Organ.

These regulations identify ballots, tamper-proof envelopes, proof of vote certificates, unused voting impediment certificates, fact sheets, flip charts, and posters, among others, as **expendable material**[23] (non-sensitive). They must be unused, destroyed, and, when appropriate, recycled. Furthermore, the **non-expendable material** (sensitive) makes it possible to check the citizens who legitimately cast their ballot, and it must be organized, kept, and safeguarded by the Departmental Electoral Tribunals (TEDs). Non-expendable material consists of eligible voter roll (*lista índice*), and ballot count and tally sheets.

Expendable Material (non-sensitive)	Non-Expendable Material (sensitive)
– Ballots – Tamper-proof envelopes – Proof of vote certificates – Unused voting impediment certificates – Guides – Fact sheets – Flipcharts – Posters	– Voter rolls (or voter registration records) – Ballot count and tally sheets

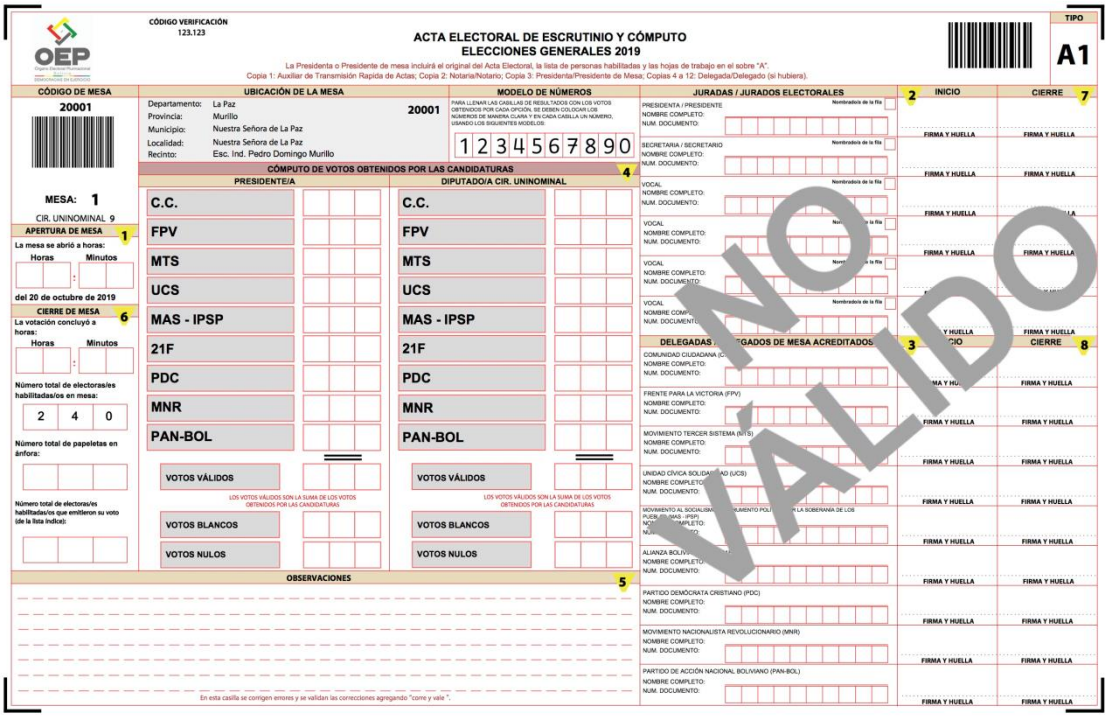
According to the Law on the Electoral System (026), the **electoral tally sheet**, "is the single official document where the sworn polling staff records the information on the polling station's opening, the voting process, the composition of the polling staff, the list of delegates from political organizations, the ballot count and tally sheet, observations, resources, and closing of the polling station." The law also provides that "the names of sworn polling staff members and the delegates from political organizations must obligatorily appear with their respective signatures and fingerprints."[24]

In the electoral tally sheets, the valid, blank, and spoilt votes are recorded, as well as the time of the opening and closing of the polling station and the total number of eligible voters at the voting table, ballots in the ballot box, and voters who cast their ballot (from the eligible voter roll).

According to Article 49(a) of the Regulations for the 2019 General Elections,[25] during the ballot count, the polling staff must check to see if the number of ballots in the ballot box matches the number of citizens who cast their ballot in accordance with the voter roll, and "if there are more ballots than voters who exercised their right to vote, the surplus number of ballots shall be randomly removed and nullified by placing the word "voided" along with the signature of the chairperson." Once this cross-checking is finalized, the staff will proceed to count the ballots.

[23] Regulations on Electoral Materials, Article 12.
[24] Law No. 026 of the Electoral System, Article 140 (Electoral Tally Sheet).
[25] Approved by means of Resolution TSE-RSP-ADM-No. 0230/2019 of May 24, 2019.

The Law on the Electoral System provides that "the results of the voting tables recorded on the ballot count and tally sheets are final and not subject to revision"[26] and become official records for a five-year period after the election. That is, the tally sheets are deemed to be sensitive material because, in Bolivia, it is not possible to recount the ballots and the tally sheets authenticate the result of each voting table.



Electoral ballot count and tally sheet (Training)

Voter rolls are classified as sensitive material because they bear critical information to validate the data recorded in the electoral tally sheets. Despite the above, this document was reported completely lost in four departments. That is, 13,176 tally sheets cannot be validated on the basis of the voter roll because the latter document was burned. Because recounting ballots is inadmissible, it is impossible to be certain about the number of ballots cast in these more than 13,000 voting tables. In addition, it is important to mention that, in many cases where the material had not been set on fire, the voter rolls could not be located either, on the grounds that they were misplaced with the non-sensitive material.

- ***Printing and inventory of the electoral materials***

The auditors requested the contracts for the ballot and tally sheet printing services from the TSE for the purpose of securing evidence of the inventory of existing electoral materials for this election.

In response to this request, the TSE provided the auditors with the following documentation:[27]

[26] Article 173.

[27] Annex 4 – Documents relative to the printing of the ballots and electoral tally sheets.

1) Contract TSE-DNJ-SG-EG No. 007/2019 entered into with the company Impresión Digital Personalizada S.R.L. to print 33,305 ballot count and tally sheets (national vote) for the general elections of 2019.

2) Technical bid of company Impresión Digital for procurement process TSE/ANPE/POE/EG – No. 20/2019.

3) Document DNA/SBS/CONT. No. 308/2019 notifying the TSE Service Inspector of his designation to audit the process "Ballot Count and Tally Sheets Printing Service (National Vote) for the General Elections of 2019."

4) Document MCR/RPA/POE-EG No. 817/2019 notifying three civil servants of the TSE of their designation to be members of the Handover and Acceptance Committee for the process "Ballot Count and Tally Sheets Printing Service (Vote National) for the General Elections of 2019."

5) Contract TSE-DNJ-SG-EG No. 01/009/2019 entered into with the company Artes Gráficas Sagitario SRL for "Ballot Printing Service for the General Elections of 2019," specifying the printing of 341,100 ballots for voting abroad and 7,209,611 ballots for voting in the country.

6) Memorandums RPC No. 014/2019; RPC No. 015/2019; RPC No. 016/2019; RPC No. 017/2019; and RPC No. 018/2019 informing civil servants of the TSE of their designation to be members of the Handover and Acceptance Committee for the procurement process: "Ballot Printing Service for the General Elections of 2019."

7) Document DNA/SBS/CONT. No. 302/2019 notifying the three Service Inspectors of the Supreme Electoral Tribunal of their designation to be Procurement Security Service Inspectors for the Process "Ballot Printing Service for the General Elections of 2019."

8) Document DNA/SBS/CONT. No. 303/2019 notifying three Service Inspectors of the Supreme Electoral Tribunal of their designation to be the Production Service Inspectors for the Process "Ballot Printing Service for the General Elections of 2019."

9) Document DNA/SBS/CONT. No. 304/2019 notifying the company Artes Gráficas Sagitario S.R.L. of the list of civil servants designated to be service inspectors.

Regarding the review of the contract for printing the ballot count and tally sheets:

- The TSE did NOT provide the audit team with the Certificate of Delivery or Remittance specifying the company's technical bid (clause 3.8).

- The technical bid (clause 5) specifies that the company shall proceed to reprint [tally sheets] requested by the Review Committee. The persons designated for this function have not been identified.

- The TSE determined in the bidding process that defective, damaged, or leftover material[28] "must be handed over to the Service Inspector for its respective destruction. The awarded company

[28] Materials are deemed defective when they are "sheets (original or copies) that do not meet the technical characteristics stipulated in the contract, with variations in the color or quality of the printing, in the dimensions, folded sheets, among others."

must have a paper shredder or cutting machine or something similar for this purpose."[29] The leftover material is defined in the document as "overproduced material in good condition."

- The TSE did NOT provide the audit team with the "Destruction or Return Certificate" pertaining to the destruction of the defective, damaged, or leftover material.

In the ballot printing contract, there was a clause specifying that "all leftover material, that is, overproduced ballots in good condition (folded), shall be handed over to the Service Inspector or Inspectors correctly packaged and labelled LEFTOVER BALLOTS, noting the number of each type of ballot."

In view of the authority granted to a "Review Committee" to authorize the reprinting of ballots, it is important for the awarded companies to publish the number of ballots handed over to the TSE, as well as the respective Delivery (or Remittance) Certificate and the Destruction or Return Certificate.

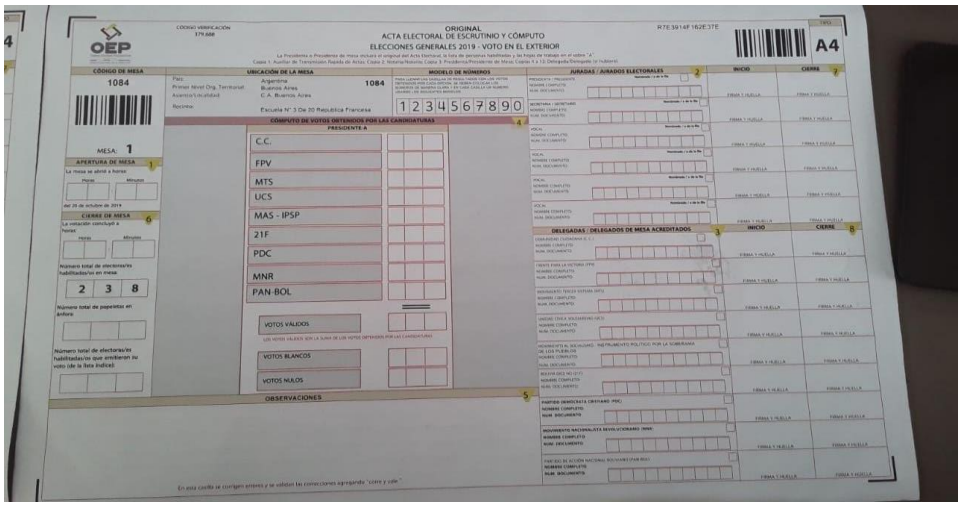
The TSE did NOT provide the audit team with the contract or any documentation specifying the number of Ballot Count and Tally Sheets that were printed for the voting abroad.

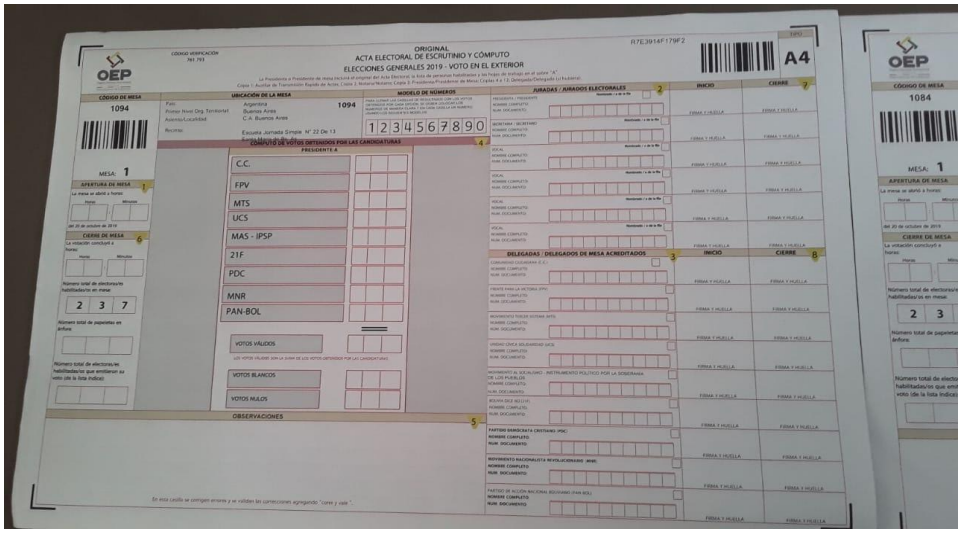
In this regard, the auditors who were present in the TSE to check the tally sheets of voting abroad observed two uncompleted original tally sheets (1084 and 1094), which seemed to have been discarded because there was a mistake in the printing of the number of the voting table of the respective polling station. According to the explanation received, the hexadecimal codes in each tally sheet had been printed prior to those that were ultimately used. The audit team was unable to consult or request further information on this matter. Without detriment to the above, it believes it makes no sense that original material that seemed to have been discarded because of errors or flaws has not been duly destroyed or unused.

Because both the ballot printing contract and the tally sheet printing contract (national) stipulated that all defective, damaged, or leftover material must be handed over to the TSE Inspectors, it is important for the electoral organ to be able to provide further information about those cases where material had to be discarded, the reasons for the latter, and what happened to it, because the presence of these tally sheets makes it possible to question whether all the leftover or defective material has indeed been destroyed.

[29] Section "Packaging and Form of Delivery, specified under General Characteristics of the Services" of the Technical Bid.

Blank original (defective) tally sheets found by the auditors





Findings on the inventory

Finding two original (defective) tally sheets from the vote abroad in the offices of the TSE is an anomaly and provides clues that the procedures for destroying defective and/or leftover materials (in good condition) were not followed.

- **Procedures for the delivery and handling of electoral materials**

National Territory

For the general elections of October 20, 6,974,363 citizens were eligible to vote in 5,132 polling stations in Bolivia's 9 departments. For voting abroad (absentee ballot) program, 341,001 citizens were eligible to vote in 165 polling stations in 33 countries. To implement the electoral process, 33,027 notaries[30]

[30] The notaries provide operational and logistic support. Before election days, they are in charge of notifying the sworn polling staff on the basis of appointment memorandums, guaranteeing their participation in the training,

were designated in the country and abroad, as well as 207,322 sworn polling staff, who were chosen randomly[31] to work at the voting tables.

The Regulations on Electoral Materials mentioned earlier provides that the distribution, delivery, return, and disposal of electoral materials in each department is the responsibility of the Departmental Electoral Tribunals (TEDs). More specifically, it is the duty of electoral notaries to personally deliver on a timely basis the electoral materials received from the TED to the chairperson of each voting table.[32]

Regarding the steps of the Chain of Custody, they are set forth in the 2019 Election Plan as described below:

a. TED delivers the complete electoral cases to the notaries of each previously established zone (days prior to the elections).

b. On the day of the elections between 4:00 a.m. and 6:30 a.m., the notaries must deliver the cases to the sworn polling staff of each voting table in the polling stations.

c. The voting table's chairperson must organize the materials along with the other polling staff and start the voting at the scheduled time.

d. After 8 working hours, so that citizens can cast their ballot, the chairperson of the voting table must close the table and start counting the ballots. Authorized delegates from political parties may be present at this ballot count.

e. Once the ballot count and tally has finalized, the polling staff must insert, in an organized fashion, the materials into the corresponding envelopes[33] (A, B, and C).

- **Envelope A**: Electoral tally sheet, eligible and ineligible voter rolls of the voting table (or voter registration records), and worksheets. If applicable, it also includes the appointment document for the designation of new polling staff.

- **Envelope B:** used ballots.

- **Envelope C:** duly voided electoral ballots and unused proof of vote certificates, electoral supplies, and other materials.

f. Thereafter, "the chairperson of the polling staff shall deliver, *against receipt,* a copy of the tally sheet along with three tamper-proof envelopes to the Electoral Notary of his or her polling station."[34]

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and overseeing the organization of the voting tables. On election day, they provide information to citizens, respond to queries and complaints, and settle disputes that the polling staff are unable to resolve. They are also in charge of handing over the polling case to the polling staff on election day and retrieving it, as well as retrieving the tamper-proof envelopes with the electoral tally sheets that they shall take to the Electoral Tribunals for the official count.

[31] Informative Document of MOE-OAS Bolivia, pages 12 and 15. Digital information delivered by the Plurinational Electoral Organ for the Electoral Integrity Analysis.

[32] Article 69 of Law No. 018.

[33] Law No. 26 on the Electoral System, Article 142 (Tamper-Proof Envelopes).

[34] Law No. 026 on the Electoral System, Article 172.

The electoral notary must gather all the cases under his or her responsibility and proceed to go to the TED, escorted by the police, for the official ballot count of each department.

g. Law 026 on the Electoral System establishes that the delivery of the envelopes at the TED "shall be confirmed *in a receipt certificate,* in accordance with the model laid out by the Supreme Electoral Tribunal."[35]

As soon as envelopes A, B, and C reach the Departmental Electoral Tribunals, the Departmental Ballot Count starts. At that stage, the following steps must be taken:

a. The Tribunal in plenary must have at least three of its members and initiate an extraordinary permanent plenary session.

b. The Head of the Technology Section of the TED must set the Departmental Count System at zero and sign the relevant certificate.

c. The members of the Tribunal in plenary must start opening each one of the A envelopes, containing the original tally sheet with the data that will be entered into the count. At that time and in the presence of the delegates of the political parties, they must approve the tally sheet and continue with the following. If any member of the Tribunal does not agree, they must respond to the appeals and observations, always taking note of the final decision.

d. When the official count has finalized, they must print the official document called the Departmental Ballot Count and Tally Sheet of the General Elections of 2019, which must be signed by all attending members of the Tribunal in plenary and the representatives of the political parties, among other members attending.

The procedure specified above must be replicated in each one of the nine Departmental Electoral Tribunals in order to count all the electoral tally sheets nationwide. For the tally sheets from abroad, the procedure was different, as indicated below.

Tally Sheets from Abroad

Pursuant to the provisions of Bolivia's national laws,[36] the vote from abroad was conducted only for electing the offices of President and Vice-President. Voting took place in 33 countries abroad, where there were 341,001 citizens in 165 polling stations.

The process of shipping the electoral materials to each one of the countries where the election was held started with stocking the material at the headquarters of the Supreme Electoral Tribunal (TSE) located in San Jorge. Once all of these supplies produced by the contractors were at headquarters, they were transported to the offices of the courier company hired for the election. At this point, the cases were packed with the tamper-proof seal of the Ministry of Foreign Affairs of Bolivia.[37] After that, the electoral materials were shipped to each country via diplomatic pouch.

[35] Article 174.
[36] Article 199 of the Law on the Electoral System of Bolivia. Law No. 026.
[37] Instruction from the Office of the President of the TSE- Committee on Voting Abroad No. 007/2019.

The shipment of the cases to the polling places was completed almost in its entirety, with the exception of the Municipality of Biedma in Argentina, where the materials arrived only two days before the voting started, that is, five days later than scheduled.

The Supreme Electoral Tribunal hired (via the consulates of each country where the voting was conducted) staff to act as electoral notaries abroad. After the ballot count and tally sheets, the notaries sent photographs of 1,507 ballot count and tally sheets. The auditors checked whether these photographs (the same image) were used not only for the transmission of preliminary results (TREP) but also for the official ballot count of the 1,507 tally sheets of the vote abroad.

When the election was completed, the international shipment of the materials to the TSE of Bolivia started, using a private courier service hired for the purpose. It is important to highlight that, although specific information about the conditions of the contract awarded to this company was requested, to date the requested documentation has not been received from the TSE. By Saturday, November 9, the audit team confirmed the arrival of 1,142 tally sheets, out of a total of 1,507 waybills, located in this locality of the TSE.[38]

Findings on management of electoral materials

At the headquarters of the Supreme Electoral Tribunal, packages from abroad left unopened for several days were observed. In addition, it was noted that receipt of the packages did not follow any pre-established order, whether by region or country, which made it difficult to systematize them and ensure their traceability. It was also possible to observe that the material coming from abroad was not verified efficiently because it relies on the inputs that the Supreme Electoral Tribunal must provide. The places for this activity were not the most adequate, and the staff engaged in this task was very limited.

[38] Witness testimony from the Acting Director of the National Electoral Processes Department.

Supreme Electoral Tribunal of Bolivia

It was clear that the Supreme Electoral Tribunal does not have a protocol or procedure for retrieval of electoral materials from abroad. Shipment of the electoral materials depends, first of all, on the time it takes for the different notaries to pack it for transport, the level of coordination level between said notaries and the Bolivian consulates in each country, and the time of shipment estimated by the courier service for shipping all the materials to headquarters of the Supreme Electoral Tribunal in La Paz.

The Plurinational Electoral Organ does not have any documentation substantiating compliance with Articles 172 and 174 of Law 026 on the Electoral System. The auditors did not observe any certificates of receipt or against delivery that would ensure traceability of the sensitive electoral materials.

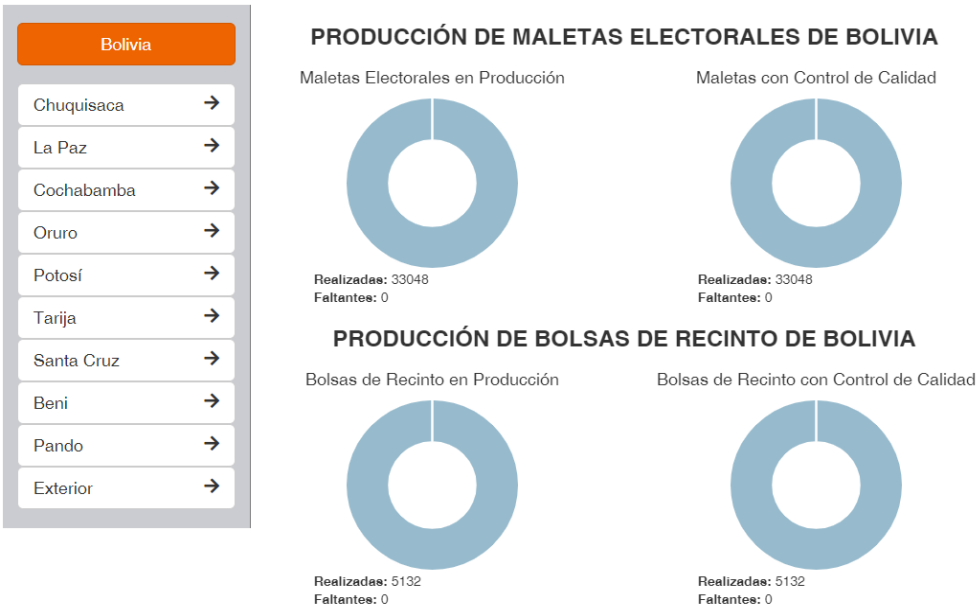
Although this documentation is clearly required by law, the auditors were informed that the Chairpersons of the Electoral Councils were not required to sign any acknowledgments of receipt and that, if they did sign them, this documentation would be viewed as non-sensitive material; as a result, it would be very difficult to secure a copy of the document. They suggested that the auditors refer to the data provided by the Monitoring System, which is described in the section below.

- **Election monitoring and follow-up system**

Article 34 (l) of the regulations on electoral materials providesthat “the National Information and Communication Technologies Department, in coordination with the National Electoral Processes Department, shall implement a system to monitor and follow-up on instances of the case and bag of the polling station such as preparation, custody, distribution, and the corresponding delivery.” Likewise,

it indicates that "the staff in charge of the instances of the case and bag of the polling station are required to ensure that each stage is recorded in the system: preparation, custody, distribution, and the corresponding delivery." Finally it indicates that the notaries are required to report the delivery of the polling station case and bag to the polling staff.

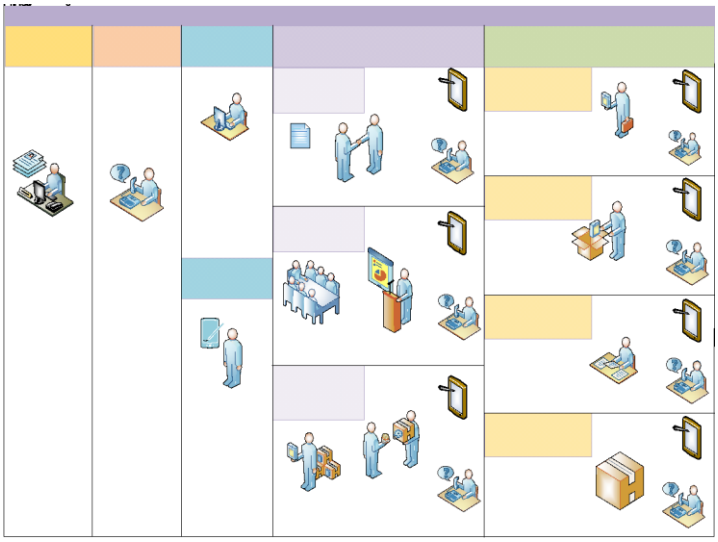
The OEP developed the Election Monitoring and Follow-up System. With regard to the electoral case and bag, information available on this portal is confined to reporting that 100% of the cases and bags have been produced. There is no information about the dates of manufacture or the staff in charge of preparing them.



As part of this system, a computer tool installed on mobile devices was implemented providing information in real time about the progress of each one of the activities of the electoral notaries.[39]

The table below specifies the seven reports that the notaries had to submit to the OEP, including: 1) Notification to the Sworn Polling Staff; 2) Training of the Polling Staff; 3) Receipt of the Electoral Cases; 4) Delivery of the Cases to the Sworn Polling Staff; 5) Opening of the Voting Tables; 6) Stipend paid to the Polling Staff; and 7) Close of Balloting at the Voting Table.

[39] Handbook for Users of the departmental Internet application: Monitoring and Follow-up Systems for Electoral Processes.



Source: National Information and Communication Technologies Department of the TSE

In addition, the audit team received report No. DNTIC- INT No. 0319 /2019, specifying the time of delivery of the electoral cases in accordance with the information entered by the notaries of the monitoring system.

Delivery and Receipt of the Electoral Cases according to the Monitoring System

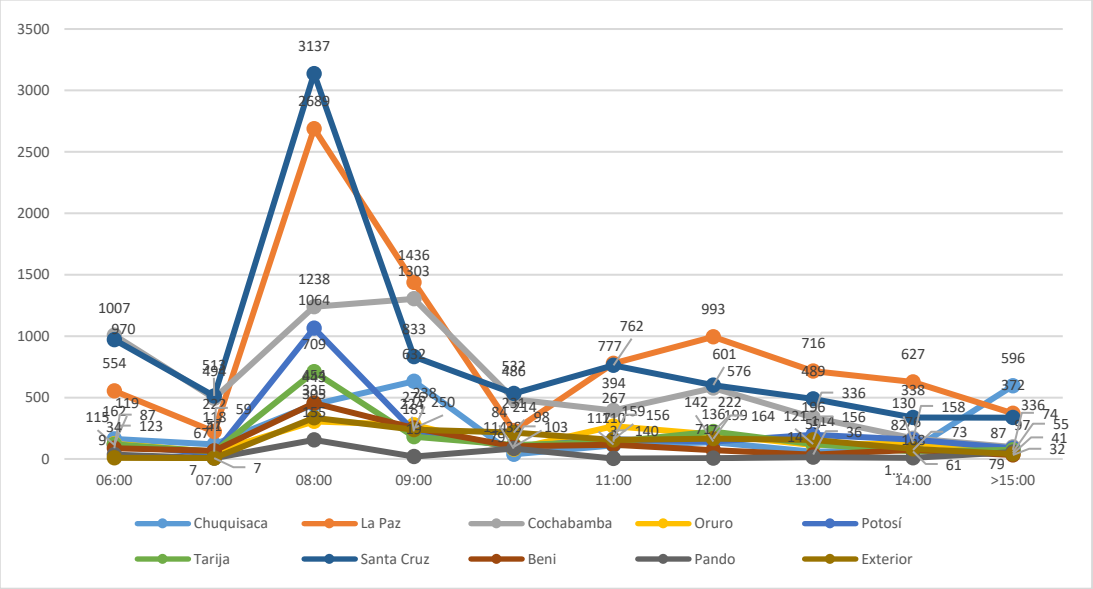
Department	Number of Electoral Cases	Starting Time of Delivery of Cases (Notaries to Voting Table Chairpersons)	End of Delivery of Cases (Voting Table Chairpersons to Notaries)	Total Cases
Chuquisaca	1828	06:21:07	23:19:23	1828
La Paz	8988	06:20:35	23:38:32	8988
Cochabamba	6134	06:20:25	23:36:28	6134
Oruro	1646	06:20:29	22:37:28	1646
Potosí	2338	06:20:26	22:24:24	2338
Tarija	1802	06:20:27	22:52:15	1802
Santa Cruz	8621	06:20:25	23:58:41	8621
Beni	1302	06:20:33	20:48:31	1302
Pando	389	06:22:00	21:27:04	389
Exterior	1507	04:28:05	23:17:13	1507

Source: No. DNTIC- INT No. 0319 /2019

The table shows the time of delivery of the cases to the voting table chairpersons (sworn polling staff) in accordance with the electoral monitoring system, before the start of election day, and their retrieval when the ballot count ended. This database received information entered by the electoral notaries via an application installed on mobile devices.

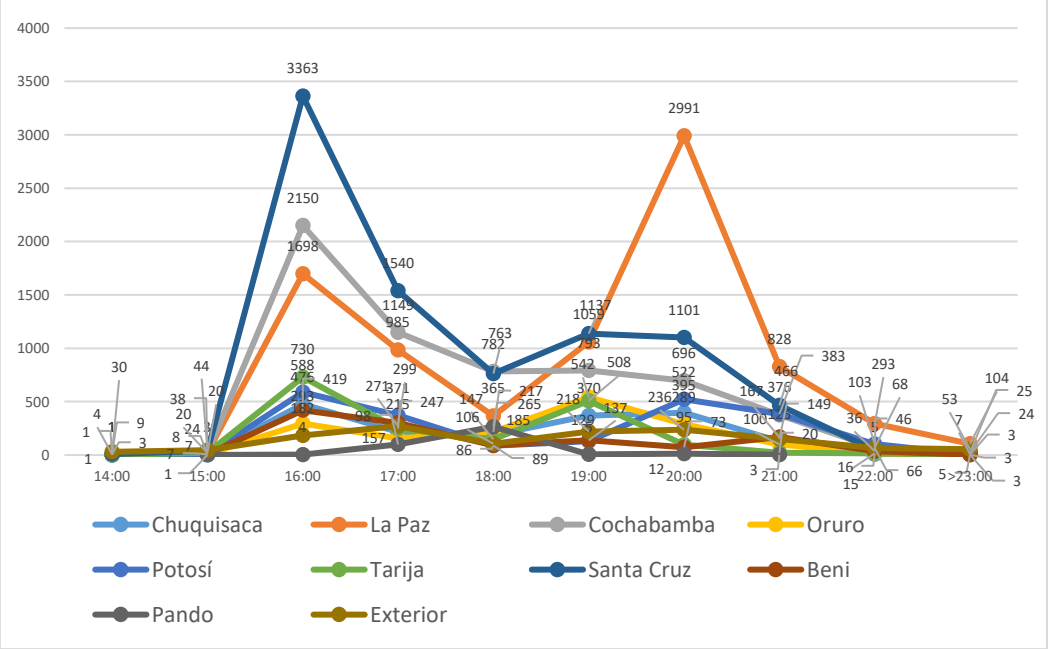
Figures 1 and 2 show the time when the voting tables opened and closed, according to reports entered manually by the electoral notaries, as set forth in Report DNTIC- INT No. 0319 /2019.

Opening Time of Voting Tables



Source: No. DNTIC- INT No. 0319 /2019

Closing Time of Voting Tables



Source: No. DNTIC- INT No. 0319 /2019

Findings on the monitoring system

a) Preparation, custody, and distribution:

- The reports pertaining to the production of electoral cases and bags of the polling stations do not provide detailed information on the staff in charge of these tasks, nor the time when they were assembled or the place where they were stored for safeguarding.

- Although the monitoring system indicates that delivery of electoral cases to the sworn polling staff started on October 20 at 4:28 am and that the last case was returned to the notaries at 23:58, it was not possible to confirm this information, because there is no physical documentation substantiating the facts. The auditors were told that this information is neither recorded nor stored.

b) Election day

The information remitted by the notaries on election day via the monitoring system is not reliable. There are two principal reasons for the above:

- The information on the opening and closing of the voting tables does not necessarily reflect what really happened. According to this report, a total of 10,500 voting tables (more than 30% of the total) opened between 11:00 and 15:00, although the Regulations for the General Elections of 2019 stipulates that voting tables cannot be installed after 10:00 am (barring exceptional cases). It can therefore be concluded that the data from the monitoring system shows the time when the notaries sent their reports on the opening time of their voting table, but not the time when the voting tables started functioning.

- Neither the monitoring system nor report DNTIC-INT No. 0319 on this application provide physical documentation or backup data to substantiate the information reported by the notaries.

c) Post-election stage

Report No. 7 of the monitoring system only stipulates the closing of the voting table and not the receipt of the tamper-proof envelopes by the notaries.

Conclusion

The monitoring system is not a tool that can provide any certainty about the custody of sensitive electoral materials either before, during, or after the election.

- **Safeguard measures for electoral materials**

The Supreme Electoral Tribunal signed an Interagency Cooperation Agreement with the Bolivian Police and Armed Forces to guarantee the security of the electoral materials during their transport. According to the agreement, these institutions were required to safeguard the transport of the tamper-proof envelopes that the electoral notaries were taking to the Department Electoral Tribunals (TEDs). In turn, the OEP also had a plan for the Transport and Delivery of the Tamper-Proof Envelopes.[40] Nevertheless, it was clear that the latter does not mention the participation of security forces in the tamper-proof

[40] Codified in document PRO-JOR-TES-04.

envelope custody process. A review of both protocols (Interagency Cooperation Agreement and the Procedure for the Transport and Delivery of the Tamper-Proof Envelopes) points out that these contradict each other regarding the instructions that, according to them, they must follow in all of the departments.

Although there is a cooperation agreement between the electoral authority and the security forces, at meetings held with representatives of the National Electoral Processes Department, as well as with the National Vital Statistics Service Department (SERECI), the auditors were told that the presence of security forces for the transport of sensitive electoral materials from the polling stations to the headquarters of the TEDs was not mandatory, because, according to those interviewed, "there were no regulations for that."

Those interviewed in the TSE stated that, because there is no requirement involved, the transport of electoral materials did not benefit from any custody by security forces in any of the departments. State collaboration and coordination is governed by Law 026 on the Electoral System (Article 149), with an article that establishes that the Bolivian Police and Armed Forces must guarantee the security of all activities in which they are required.

In the electoral operational plans laid out by the TSE[41] and each department's TED,[42] there are descriptions of all of the procedures for the transport of electoral materials. The Logistics Unit of each department proposed its own organization and implementation timetable to organize, distribute, and escort the routes with the electoral materials.

In the departments of Chuquisaca and Oruro, draft electoral routes and the organization of displacements in both urban and rural areas were drawn up. However, no documentation was obtained that would substantiate the formalities of receipt and delivery of the documentation, or the security protocols implemented along the routes, or information about the places for storing the materials. The information gathered by the auditors is confined to payrolls, itinerary, and mileage.

In the departments of Beni, Potosí, Tarija, and Santa Cruz, no record was obtained on the type of situations that occurred on election day during the distribution, escort, and retrieval of the sensitive materials. No records signed by staff providing the escort were obtained, and there is no information on the time, hours, and days for which custody of the materials was provided. The auditors observed there was no documentation accurately substantiating the number of Bolivian police officers and armed forces troops who escorted the many parts of the election.

As indicated[43] to the audit team, each Departmental Electoral Tribunal had to draw up a Strategic Institutional Plan, on the basis of guidelines from the Supreme Electoral Tribunal. This strategic plan was requested from each one of the TEDs. Nevertheless, up until the day this report was submitted, it was only the Departmental Electoral Tribunal of La Paz that provided documentation incorporating measures to guarantee the security of the electoral materials. In this Plan of La Paz for the General

[41] Code: POA-E-DNPE-20-10-2019
[42] Annual Electoral Operations Plans – 2019 General Elections – Departments.
[43] Meeting with the Acting National Director of Electoral Processes, Mr. José de Ugarte, at the Supreme Electoral Tribunal in San Jorge on November 5, 2019.

Elections of 2019,[44] a description is provided of the police operation, both civilian and military, that had to be implemented for the elections, as specified below:

- Safeguarding the distribution and transport of electoral cases, escorting the committees to the polling stations of the cities of La Paz and El Alto on October 18, 19, and 20, 2019.

- Calculating the number of police officers for each polling station on October 20, 2019 for the purpose of safeguarding and ensuring law and order for the urban area of La Paz-El Alto.

- Coordinating with the committee for the retrieval of tamper-proof envelopes from the urban area of La Paz-El Alto, and ascertaining the three rallying points in the city of El Alto, the city of La Paz, and Zona Sur (Southern Area).

- Safeguarding the retrieval of tamper-proof envelopes, calculating the necessary number of police officers to escort the tamper-proof envelopes to the TEDLP counting center.

- Establishing a security cordon for election day on October 20, 2019, in the area surrounding the operations center for the entrance of the committees for the retrieval of the tamper-proof envelopes.

- In addition, there will be an escort for the TEDLP authorities, with the assignment of police officers for their security on election day.

- Digital information on the polling stations, routes, and operational working committees will be provided to the Planning Unit of the Police for drawing up the Security Plan.

In the departments of Chuquisaca and Potosí, the electoral tally sheets were partially counted in localities different from the ones established by the Tribunals in the plenary of each TED. In the first case, they were transferred to the municipality of Zudañez (one and a half hours away from the TED), and in the second case, to the municipality of Llallagua (three hours away from the TED). In both cases, the OAS was informed that the initiative was taken by the TEDs, with the argument that, in the original places, the conditions to continue the process were not available. Although in view of the conditions presented, the change of polling stations could be justified; according to the delegates from the political parties, they were not informed on time about these changes, as a result, they were unable to witness the official count after the change in the location of the premises.

According to the Interagency Cooperation Agreement signed between the Supreme Electoral Tribunal (TSE) and the security forces (Bolivian police and armed forces), they were required to safeguard the transport of the envelopes carried by the electoral notaries to the Departmental Electoral Tribunals (TEDs). Nevertheless, OAS experts observed that, in none of the five departments are there any signed records or affidavits substantiating the actions relative to the transfer of electoral materials (Envelope A) both during election day and in the post-election stage, including materials transferred from headquarters.

On the basis of the review of the signed Interagency Cooperation Agreements, it is noteworthy that the fourth clause indicates the same actions for both the police force and the armed forces. In other words,

[44]Section 3.2.2 Police Protection for the General Elections of Bolivia of 2019.

there is no division of specific tasks between the two institutions, a situation that jeopardizes the elections.

At the meeting held with the representatives of the Bolivian Police Force,[45] the auditors were informed that there was no documentation substantiating which departments benefited from any safeguarding of the transfer of the tamper-proof envelopes from the polling stations to the TEDs, and which departments did not, because there was no single consistent instruction nationwide.

Findings on the safeguard measures and conditions of the electoral materials

Although Law 026 on the Electoral System establishes that public security forces must cooperate with the electoral authority to guarantee the security of the entire electoral cycle and, despite the signing of two interagency cooperation agreements for this purpose, the audit team witnessed little or no coordination between the TEDs and public security forces. Neither the OEP nor TEDs have any documentation providing evidence that the electoral materials were safeguarded by public security forces.

- **Conditions of the electoral materials for the General Elections of 2019 in the post-election stage**

The auditors confirmed that the staff in charge of safeguarding the electoral materials were unaware of these conditions because they were unable to differentiate the type of protection provided for expendable materials from that given for non-expendable materials. In visits made to the country's five TEDs (Pando, Cochabamba, Tarija, Beni, and La Paz), electoral cases were found with ballots used in places that did not match the spaces designated, involving a location without safeguards or in precarious conditions. This occurs because of incorrect planning for transferring the materials and their subsequent organization and safeguarding in the tribunals.

Departmental Electoral Tribunal of Pando

According to information provided by the authorities of the TEDs from the 9 departments at a meeting held on November 4 in La Paz, as well as information gathered during onsite visits, an inventory is presented below aimed at reflecting the conditions of the electoral materials **reported** in the post-

[45] Meeting with Lt. Col. Xavier Salguero Hurtado, Head of the National Department of Operations, and with Col. Claudio Espinoza Luna, National Director for Planning. Meeting held on November 6 at Bolivian Police Headquarters.

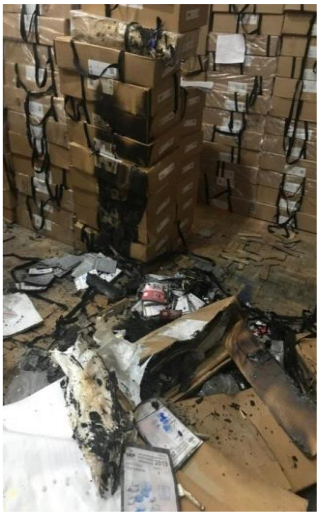
election stage. The percentages are approximate and based on what was officially reported by the departmental authorities.

Department	Universale of tally sheets / eligible voter roll	Non-expendable material (sensitive)				Expendable material (non-sensitive)
		Tally sheets in good condition	Tally sheets burned or destroyed	Voter roll in good condition	Voter roll burned or destroyed	
POTOSÍ	2338	75%	25%	0%	100%	100% burned
COCHABAMBA	6134	99.5%	0.5%	100%	0	100% in good condition
BENI	1302	100%	0	83.8%	16.2%	*Partially* burned
SANTA CRUZ	8621	19% partially saved	81%		100%	75% burned
LA PAZ	8988	100%	0	100%	0	100% in good condition
PANDO	389	100%	0	0	100%	*Partially* burned or wet
CHUQUISACA	1828	99.9%	0.01%	0	100%	100% burned
TARIJA	1802	100%	0	100%	0	*Partially* burned
ORURO	1646	100%	0	100%	0	100% in good condition

The fact there were sensitive materials (tally sheets and voter rolls) that were burned highlights the absence of safeguarding or adequate planning, as well as little coordination between the TEDs and security forces. In addition to the above, the partial or total burning of the electoral facilities in Chuquisaca, Beni, Pando, Potosí, Santa Cruz, and Tarija is noteworthy.

Departmental Tribunal of Beni

Departmental Tribunal of Pando



Departmental Tribunal of Tarija

Findings on the safeguard measures and conditions of the electoral materials

Although Law 026 on the Electoral System establishes that public security forces must cooperate with electoral authorities to guarantee the safety of the entire electoral cycle, it is evident that interagency coordination for this purpose is missing. None of the three institutions has documentation proving that the electoral materials were in the custody of public security forces.

Because in Bolivia it is not possible to recount the ballots, the safeguarding of the electoral tally sheets is a critical aspect to guarantee the electoral process. Monitoring those who handle the tally sheets and where they are located at each moment is fundamental. In view of the many reports complaining about an alleged alteration of the electoral tally sheets, the OAS audit team cannot ascertain that the electoral materials were duly safeguarded at all times. In addition to the above, as explained previously, the auditors were unable to witness any inventory accurately calculating the number of tally sheets (national and abroad) that were printed and delivered to the electoral authority.

IV. FINDING 4: TALLY SHEET COUNTS ARE NOT TRUSTWORTHY; HOWEVER, A DETAILED ANALYSIS FINDS THAT TALLY SHEETS DELIVERED FOR THE FINAL 4.4% HAVE A SIGNIFICANT NUMBER OF COMMENTS

After being apprised of the findings encountered in the electoral technology components; doubts over the totality of tally sheets produced, used, and left over; the deficient chain of custody, as well as the substantiated manipulation, alteration, and forgery of several tally sheets, the auditors cannot be certain as to the absolute validity of the data contained in all of the counted tally sheets. This uncertainty over origin tends to establish a reasonable doubt about the material used to provide input for counting the ballots. Therefore, it also creates doubt about the result of this exhaustive exercise conducted by the auditors. Despite the above, the work they did and their findings are described below.

The audit team conducted a quantitative review of the data entered into the Preliminary Electoral Results Transmission System (TREP) and the Official Count System. For this study, they undertook the following procedures, among others:

1) Matching 100% of the images of the tally sheets published on the TSE's website with the official count records in the presidential election, checking the type of image (photo, scan, or invisible) and the types of observations appearing on the tally sheets.

2) Sample analysis on the composition of the voting tables, in terms of the number of sworn polling staff and electoral delegates present when the ballots were being counted at the voting table.

- **Process 1: matching 100% of the images of the tally sheets**

For the first analysis, the following fields where chosen for checking (Figure 4):

- The number of the voting table in the image (checking whether or not it matched that of the digitization as data).
- Votes obtained for each political group, valid, blank, and spoilt ballots for the presidential election (Section 4, left column).
- Presence and type of observations recorded on the tally sheet (Section 5).
- Total number of voters who cast their ballot (Section 6).
- Number of sworn polling staff signing at the end of the voting (Section 7).
- Number of voting table delegates accredited by political groups at the end of the voting (Section 8).

The results are presented in general and for subseries by crosses with other variables of interest such as:

<u>According to the time when the tally sheet was entered into the Preliminary Electoral Results Transmission System (TREP).</u>

Three groups were established according to the time the voting results were entered into the TREP:

- **TREP first part:** tally sheets entered from the beginning of the TREP publication up to the time of its interruption at 19:40 on Sunday October 20 (83.8% of the tally sheets were entered during that period).

- **TREP second part:** tally sheets entered when the TREP publication resumed functioning (October 21 at 18:30) until transmission of the TREP ended (11.8% of the tally sheets were entered during that period).

- **Only the official count:** it includes the tally sheets that were only entered into the final count but were not published in the TREP system (accounts for 4.4% of all the tally sheets).

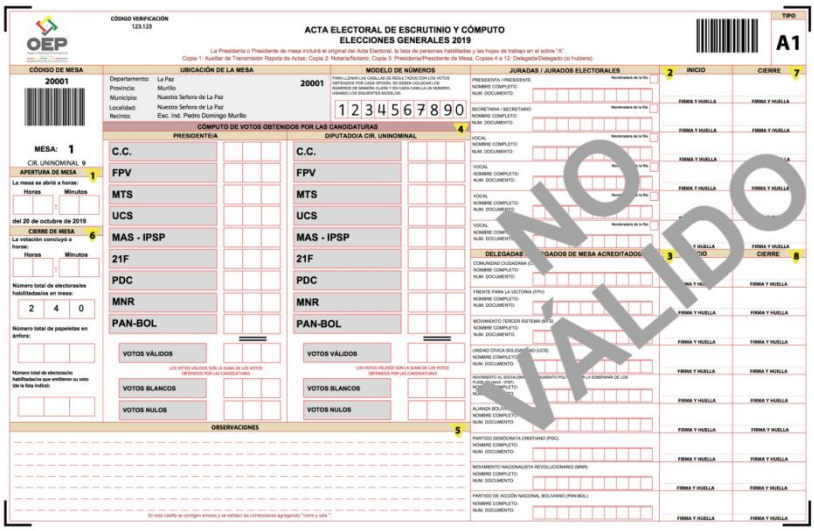
According to origin

The tally sheetspertain to the voting tables established in **Bolivia** (95.6% of the tally sheets) or **abroad** (4.4%).

According to type of image

The tally sheets were classified on the basis of whether they were **scanned** images (95.2% of the tally sheets), a **photograph** (4.7% of the tally sheets) or if the image was not there or turned out to be **invisible** (0.1%).

Image of the Ballot Count and Tally Sheet. General Elections of 2019. Numbers 1 to 6 indicate the fields chosen for analysis.



Source: Image provided by the OEP

Findings of the first analysis

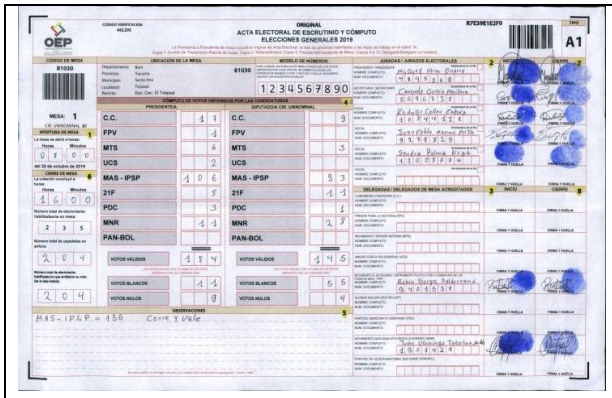
- When digitizing the tally sheets and taking into account the observations they include, note was taken that the number of ballots assigned to each political party in the official count matched 34,495 images of the tally sheets (99.8%). This information refers only to the votes assigned to the political

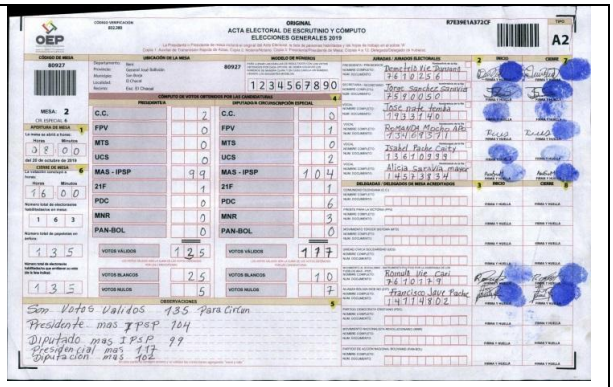
parties and does not take into account the total sum of the balloting enshrined in each tally sheet or the comparison of these figures with total ballots casts (registry of citizens on the eligible voter roll) or the total number of valid votes recorded in the corresponding checkboxes. **In this exercise, the documents uploaded into the count system were not checked to see if they were authentic, and the tally sheets that the team of handwriting experts identified as having irregularities and/or having been manipulated were not discarded.**

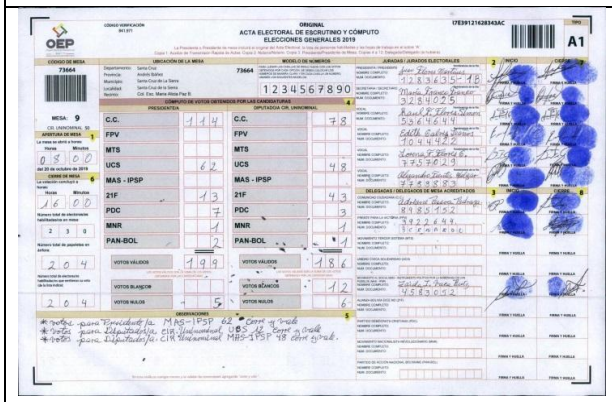
When examining the use of space for observations, it was found that 12,925 tally sheets (37%) had observations aimed at making some clarification or recording a situation occurring during the voting and ballot counting process. Furthermore, it is striking that **56% of the tally sheets that were entered directly into the official count and were never published via the TREP had observations.**

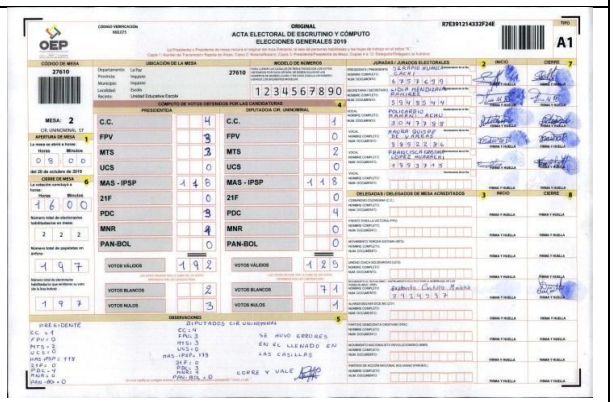
In addition, when examining the type of observations that were recorded on the 12,925 tally sheets, it is noteworthy that 18% pertained to changes / corrections in the number of votes recorded for the presidential election. The auditors also identified that, of these 12,925 tally sheets bearing comments, 846 were tally sheets that only entered into the final count (last 4.4%), of which 328 (39%) referred to changes in the ballots for president.

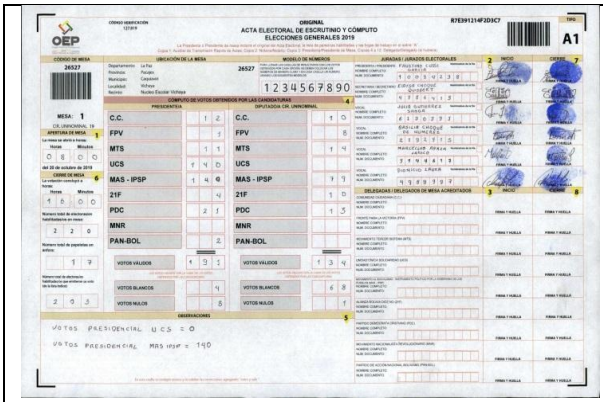
Examples of tally sheets (from the last 4.4%) with observations changing the numerical results

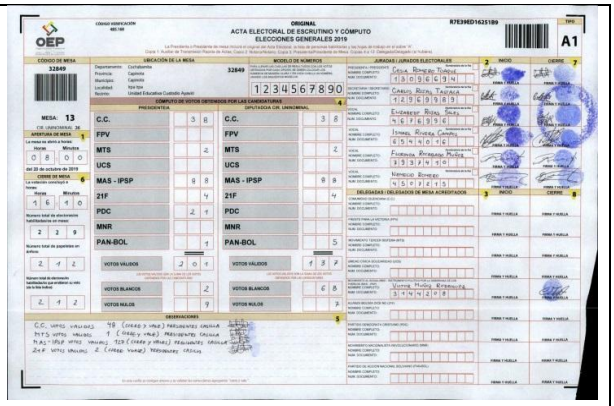












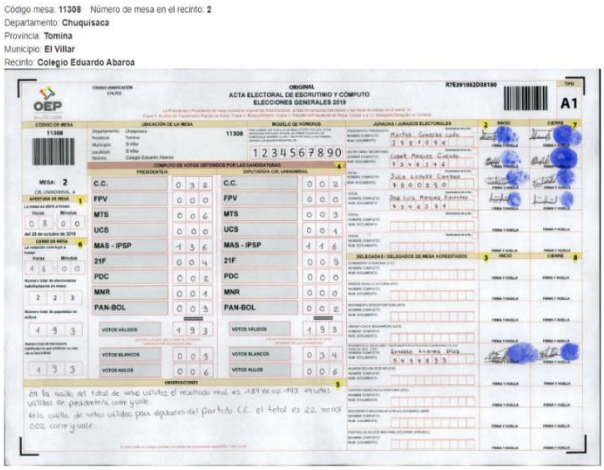
- 1,637 tally sheets were entered into the official count as photographs. Of these, 91% correspond to tally sheets from the vote abroad, as planned in the procedures that were established. The remaining 9% are photographs of tally sheets drawn up in the country's territory, which according to the regulations should have been scanned.

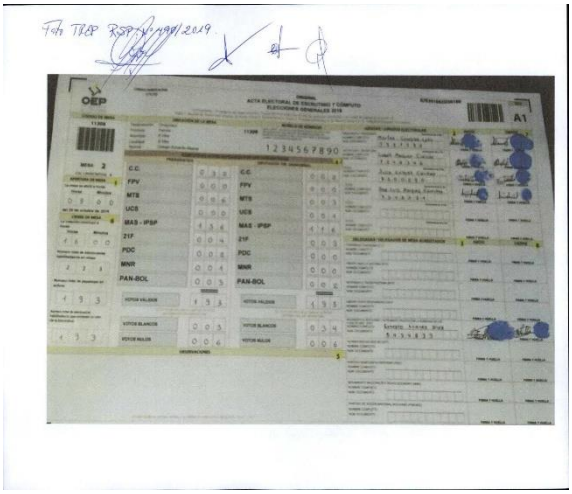
The 34,555 images of the tally sheets reviewed by the Count Center of the auditing company were catalogued as scanned, photography, or not visible. 95% of the tally sheets were scanned. Of the remaining 5%, 9 out of 10 photographs pertain to tally sheets from abroad (1,507 tally sheets). This is the procedure that was planned for the OEP to count the tally sheets coming from abroad. However, the 130 tally sheets from the national territory that were entered as photographs should have been scanned, in accordance with the regulations.

Furthermore, in this exercise, 4 images drawing attention were detected because, after having been delivered to this audit as printed photographs with signatures indicating that they came from the TREP, in the publication of the results of the official count on the OEP web page, they appear as scanned images of the following original tally sheets: 11308, 11147, 11309, and 11311.

Example of the image delivered with differences

The image on the right was delivered to the audit for review, and the image on the left was published on the tribunal's web page.

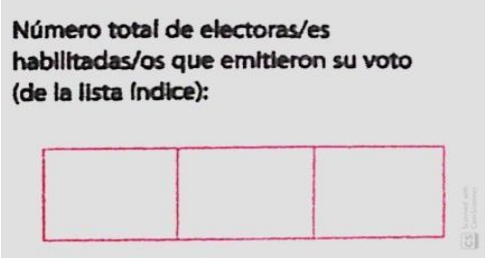




- When reviewing the checkbox on the tally sheet to record the total number of eligible voters who cast their ballot (figure from the voter roll), it was observed that there was a total of **3,022 tally sheets showing differences with the sum of the votes of the political parties plus the blank votes and spoiled votes, whose results should match**.

Although it was observed that there were cases in which these discrepancies were due to mistakes made when completing the sheet due to lack of knowledge about how to obtain the information in order to place it, or cases where arithmetical mistakes were made, there are also tally sheets where, in order to ascertain which figure is the correct one, it is necessary to resort to additional materials, such as the voter roll or the worksheets, which could not be consulted because they had been burned or lost in many cases.

It is important to mention that the tally sheet explicitly indicates that the figure must be taken from the voter roll's registry of signatures and fingerprints (see image below). In addition to the above, in those cases where more ballots were recorded than the number of voters who exercised their right to vote, Article 49 of the Regulations for the General Elections of 2019 establishes that, *"the number of excess ballots shall be taken out randomly and voided by putting the word "voided" along with the signature of the Chairperson."* In other words, Bolivian regulations provides a procedure so that the number of voters and the number of votes match, because voided ballots are not included in the count.



- In a parallel exercise, a group of auditors travelled to five departments of Bolivia (Cochabamba, Pando, Beni, Tarija, and La Paz) for the purpose of verifying the content of the tally sheets of the final count and the voter rolls (voter registration), as well as examining the conditions of the Departmental Electoral Tribunals and workflow of the chain of custody.[46] **Of the 894 tally sheets analyzed,[47] 230 tally sheets could not be matched with the eligible voter rolls (*listas índices*), because they had been partially or totally burned or were not found in the respective envelopes.**

In addition, in view of the dominant tendency of the MAS in Argentina, the auditors focused greater attention on these tally sheets. The auditors recorded at least 37 tally sheets from Argentina that showed inconsistencies with the number of citizens who voted.[48] In other words, the tally sheets

[46] The report on the chain of custody appears in another section.
[47] Which were part of a statistical sample of 2,863 tally sheets.
[48] Information was obtained from a larger number of tally sheets that showed the same situation, but because not all the backup images were available, they were excluded from the analysis.

reflected a number of ballots that was different from the total number of voters on the eligible voter rolls.[49]

– **Process 2: Sample review of the composition of the voting tables**

Using information coming from a probability sample of 5,000 tally sheets, the composition of the voting tables was examined, bearing in mind the number of sworn polling staff and the presence of delegates, and specifying the political groups they belonged to when the polling stations closed. This comparison was conducted by the ballot count audit team via observation and double entry of the number of signatures registered in the electoral tally sheets sampled (Sections 7 and 8).

It was clarified that the criterion used to record the presence of the sworn polling staff or the delegates in the comparison program was that the name, identity card number, and signature and/or fingerprint had to appear in the checkbox for closing the voting table in order to bear witness to the presence of each staff member and/or delegate. The procedure was used because there were cases where only one signature appeared in the checkbox for opening the voting table, without the possibility of confirming whether or not that person participated in closing the voting table and in entering the data onto the tally sheet.

Findings from the second analysis

- On average, there were 5.1 sworn polling staff members present at the voting tables at the time of closing.
- At 88% of the tables there was at least one delegate when the voting and ballot count closed. **On 12% of the tally sheets the signatures of delegates were not recorded at the time of closing.**

  When examining these figures, it was observed that of the total number of voting tables, 66% of them had delegates from the MAS-IPSP political party present and 55% of them had delegates from the CC political party. At 38% of the voting tables, there were delegates from both the CC and the MAS-IPSP. At 18% of the voting tables, there were only delegates from the MAS/IPSP, and 8% had only delegates from the CC.

Political Parties	Percentage of tally sheets that recorded the presence of delegates
CC	55%
FPV	8%
MTS	8%
UCS	3%
MAS-IPSP	66%
21F	29%

[49] Annex 9 – Tally sheets and covers of the eligible voter rolls. The inside pages of the rolls, whose copies are in the hands of the audit team, are not published in the present report in order to safeguard the personal information of the eligible voters, because they include: complete name, date of birth, document number, photograph, signature, and fingerprint.

PDC	3%
MNR	11%
PAN-BOL	1%
At least one delegate	88%
MAS-IPSP and CC	38%
Governing party and opposition	48%
No delegate	12%

FINDING 5: THE TREND OF THE FINAL 5% OF THE COUNT IS HIGHLY IMPROBABLE

This chapter of the report analyses the election results as they were published by the TSE. An objective analysis of electoral returns data reveals an unusual break in voting patterns towards the end of the vote count.

There are two points in this election of immediate interest. The first is the point at which some 83.85% of the cumulative vote had been counted in the TREP, because it was at that point that Bolivia's TSE stopped reporting the results. The second is when approximately 90% of the vote had been counted. At this point Mr Morales was still over a percentage point below the 10% margin required to prevent a second round.

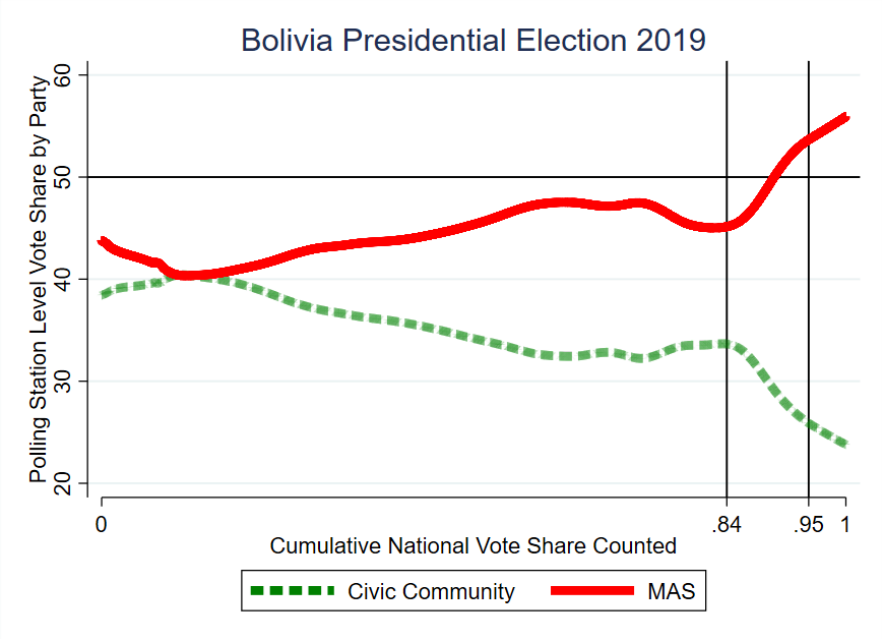
1,511 polling stations were not included in the TREP but do appear in the final computo results, which are the official vote tallies of the Bolivian system. All the analysis conducted below include these additional polling stations. Since they were not included in the TREP, they are treated as being late reporters. We stress that all the results below are based on the *computo* vote tallies. The overall conclusions do not change depending on whether we use the TREP or *computo* time stamps, though the shape of the trend lines do, since the time stamps are not perfectly correlated.

Other studies, with clearly less information and electoral analysis expertise, have argued that the Bolivian election result can be explained by a straightforward extrapolation of the TREP vote count at the 84% cumulative vote count mark. However, these reports do not comment on the steep slope of the line in that figure after the 84% threshold. They seem more intent in justifying a result than in conducting a serious an impartial analysis of the data. Whether the extrapolation is valid depends on whether the rapid increase in the MAS's advantage over its rival after that point is plausible or not. The analysis below addresses this question.

- Analyzing the Electoral Returns

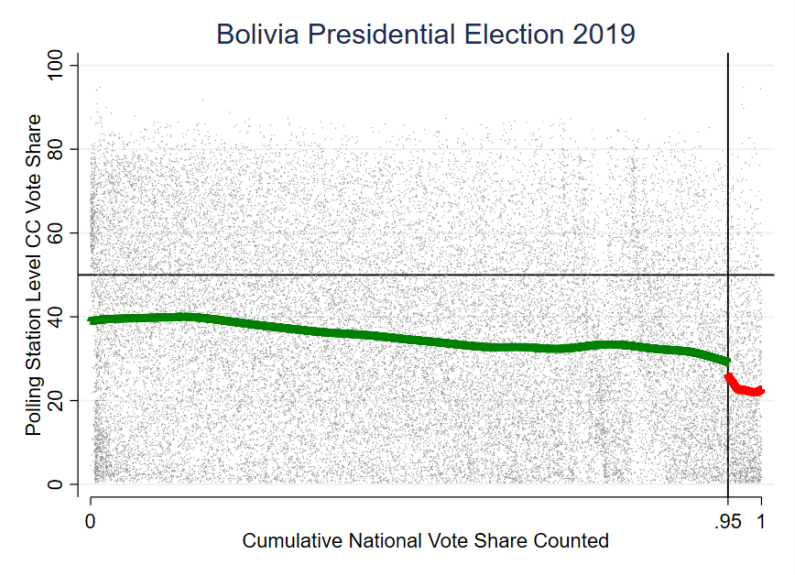
We start by analyzing the *computo* vote tallies but with the TREP time stamps, since this allows us to address directly the suggestion that the result was driven by late-reporting rural polling stations. To address this concern, we have to use the TREP time stamps. This is the only way of knowing whether a particular polling station reported early or late on election night. However, throughout this chapter only the *computo* vote tallies are considered.

First, consider the trends in the vote shares of both parties over the course of the election.

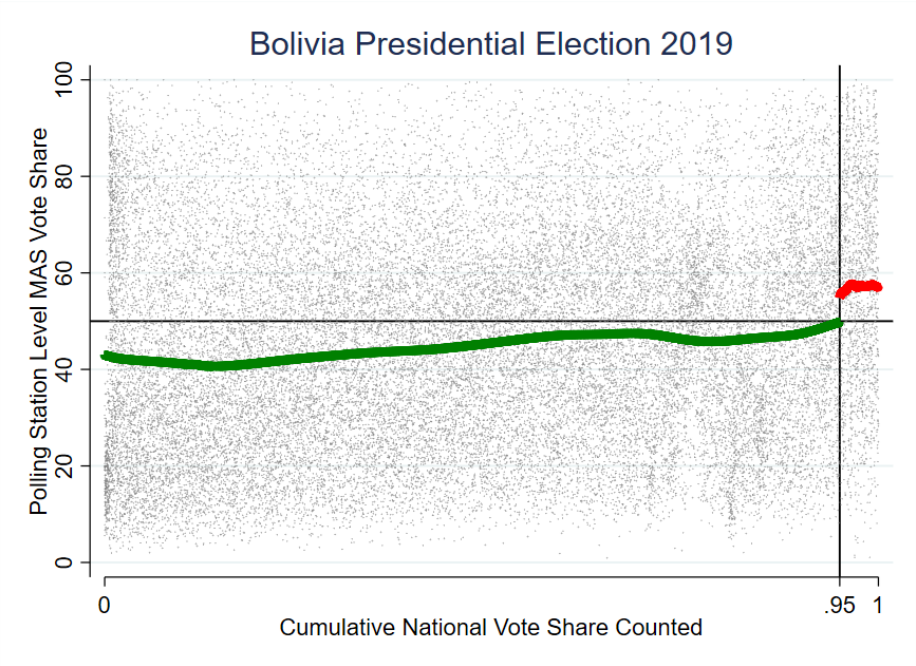


While Mr Morales began to out-perform Mr Mesa early on, leading to his 7.29% margin with 84% of the vote counted, the graph above shows that the trends for both parties change after that point. This divergence grows even sharper after the 95% mark.

To understand whether the change in trends is unusual, we treat the 95% threshold as a break point in the data to see if the trends before and after that threshold are unusually large. Consider first the vote shares across polling stations for Mr Mesa and the Civic Community. Each point in the graph below is a polling station plotted against its CC vote share. The vertical line is the 95% cumulative vote count.



Right at the 95% threshold, a break in the CC's vote trend is clearly visible. In statistical terms, this is referred to as a discontinuity and begs further scrutiny. This is even more visible if we consider the trend line for the MAS vote share (below).



The discontinuity – or break – in the trend line for the MAS at the 95% threshold is striking. Even if we accept the contention of other analysts that the late-reporting polling stations were more likely rural areas that favored Mr Morales, we would not expect to see such a sharp discontinuity around an arbitrary point such as the 95% threshold used above.

The last portion of the vote count, which favored Mr Morales substantially, is not just different than earlier parts of the evening but also sharply different than the trend just on the other side of the threshold. The difference between polling stations on one side of the 95% of the vote count and on the other should not reflect sharp urban-rural divisions.

Why is this significant? With approximately 83.85% of the cumulative vote counted, Mr Morales had a sizable lead but less than the 10% margin required for victory. With 95% of the vote counted per the TREP time stamps, the margin was still less than 10% (Morales had 43.16% at this point, and Mesa had 34.98%, a gap of 489,963 votes out of the 5,599,995 votes cast at that point).

In the final 9% of the count (last 5% of reporting polling stations in the TREP plus some 1500 polling stations not included in TREP but included in the Computo), 537,783 votes were counted. Of these, Morales won 304,214 or 56.6% of the votes, while Mesa won just 145,705 votes or 27.1% of the vote. In other words, in these final 9% of the vote, Morales average vote share increased by over 15%, while Mesa's average vote share plunged by about the same percentage. This is very unusual to put it mildly.

With 95% of the votes counted in the TREP, Morales gained a lead of 488,891 votes (8.7%). In the final 5% of the TREP alone, Morales added another 106,799 votes to his lead – out of just 290,624 total votes cast –, which pushed his overall margin to 10.11%, above the threshold required for outright victory. If we consider only the polling stations not included in TREP, then Morales obtained 128,025 votes out of 247,025, while Mesa obtained 76,315 (51,710 votes less than Morales). This means that of the overall margin of victory of just under 650,000 votes, over 156,000 came in just the final 5% of the vote count, which represents a remarkable break in the trend-line of the rest of the election.

One explanation of this unusual break in the trend is that late-reporting polling stations were more likely to be from Morales strongholds. As made clear above, even if this is the case, we should still not see such sharp discontinuities (breaks) in the trend lines. Nonetheless, we turn to considering this explanation below.

The TREP data reports results from 33,044 polling stations altogether. Of these, 31,379 reported their results before the 95% cumulative vote count threshold; 1,665 polling stations reported after. Of the late-reporting polling stations, the bulk were in one of seven departments in Bolivia. These are Beni (92), Chuquisaca (74), Cochabamba (541), La Paz (294), Potosi (215), Santa Cruz (184), and Tarija (115), which together account for 1,515 or 94% of the late-reporting polling stations with the numbers in parentheses indicating the number of polling-stations in each department that were part of the last 5% of the vote count. Other departments are not included simply because they had reported all or most of their results earlier in the evening.

While it is possible that late-reporting stations in general favored Morales, a department-level analysis raises questions about the size of the break. Consider the table below:

	Before 95% cumulative votes counted in TREP					Last 5% of TREP and Mesas in Computo but not in TREP				
	Votes Cast	MAS	CC	MAS %	CC %	Votes Cast	MAS	CC	MAS %	CC %
National	5,599,995	2,585,145	2,095,215	46.2	37.4	537,783	304,214	145,705	56.6	27.1
Beni	182,637	59,954	66,513	32.8	36.4	32,109	15,039	8,130	46.8	25.3
Chuquisaca	285,584	116,242	130,951	40.7	45.9	18,293	12,415	3,387	67.9	18.5
Cochabamba	1,001,468	561,555	337,588	56.1	33.7	143,750	97,633	31,568	67.9	22.0
La Paz	1,568,025	824,128	477,684	52.6	30.5	102,080	63,143	20,160	61.9	19.7
Potosi	305,783	146,819	104,135	48.0	34.1	58,790	33,055	15,562	56.2	26.5
Santa Cruz	1,468,966	504,731	694,881	34.4	47.3	113,609	45,467	46,582	40.0	41.0
Tarija	283,684	113,426	121,070	40.0	42.7	24,023	10,289	9,456	42.8	39.4

The first row shows the national vote count and each row below is for the named department. The first column “Votes Cast” is the total number of votes cast; the column “MAS” is the raw number of votes for the MAS while the column “CC” is the raw vote count for the Civic Community party. MAS% and CC% show the vote share at the department level. Comparing the vote shares at the department level before and after the 95% cumulative vote share is striking.

Consider *Beni*. Over the first 95% of the overall vote, the CC had a 3.5% advantage over MAS, but after that, things change and MAS gains a 21% advantage. In *Chuquisaca*, over the first 95% of the count, the CC had a 5.2% edge, which quickly turns to a 39.4% disadvantage. In *Santa Cruz*, the CC had a 13% advantage over the first 95% but it decreases to just 1% over the final part of the vote count. In *Tarija*, a 3% CC advantage over the first 95% vanishes and turns in to a 3% loss over the final portion of the vote count.

Similarly in MAS strongholds like *Cochabamba*, where MAS enjoyed a 22.3% edge over the first 95% of the count, the advantage more than doubles to 45%. In *La Paz*, a 22.1% advantage grows to a 42% advantage; and, in *Potosi*, a 13.9% advantage grows to a 40% advantage.

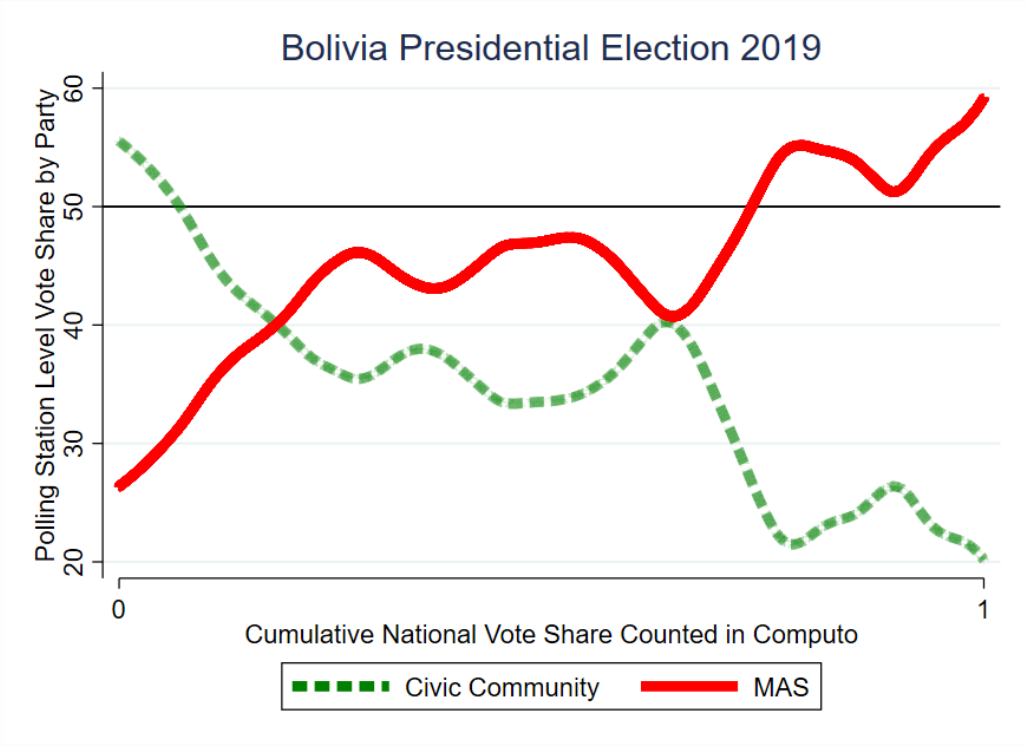
Even if the late-reporting stations were favorable to Morales and MAS, the size of the advantage the MAS enjoyed, in <u>every</u> department, over the late-reporting polling stations is extremely unusual. Indeed, all the differences reported in the table above are statistically significant at the 99% level, which means that in a normal distribution of data, such stark differences would appear extremely rarely (in these data, in fewer than 1 out of 1000 samples).

	PS-level MAS Vote Share			PS-level CC Vote Share		
	0-95%	95-100%	Computo only	0-95%	95-100%	Computo only
National	44.6	56.9	49.6	35.4	23.0	28.6
Beni	31.5	45.9	43.7	34.1	22.2	24.6
Chuquisaca	40.7	58.6	66.8	41.0	19.9	14.6
Cochabamba	54.0	65.4	62.3	33.1	21.5	24.7
La Paz	50.5	56.8	60.3	29.0	18.5	17.9
Potosi	47.3	55.3	51.3	29.8	22.7	25.3
Santa Cruz	33.1	40.6	37.1	45.1	33.3	39.8
Tarija	38.8	41.7	32.3	38.9	35.3	46.9

Using Only the *Computo* Data

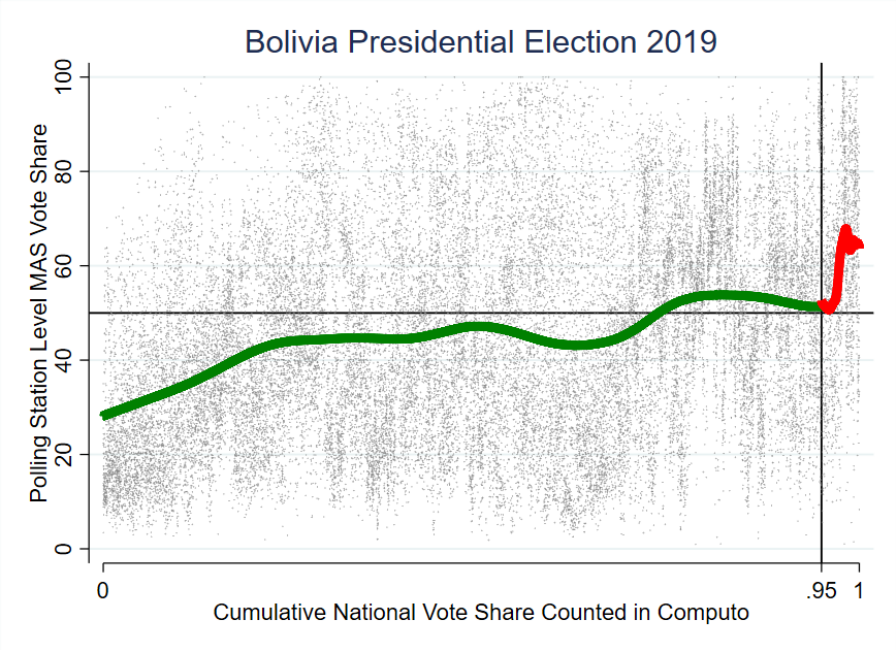
The analysis above uses the *computo* vote tallies but leverages the TREP time stamps to take seriously the contention that the overall result was driven by late-reporting polling stations. However, we should analyze if the same patterns emerge if we use only the *computo* data and time-stamps. The answer is they do. This is even more troubling for the analysts who have emphasized the rural-urban split since the *computo* data do not reflect the time the results were reported to the TSE and so should not reflect any rural vote coming in late. Yet similar patterns emerge.

Below we replicate the figures and analysis above using only the *computo* data and time stamps. First, we consider the figure with the overall trend lines.

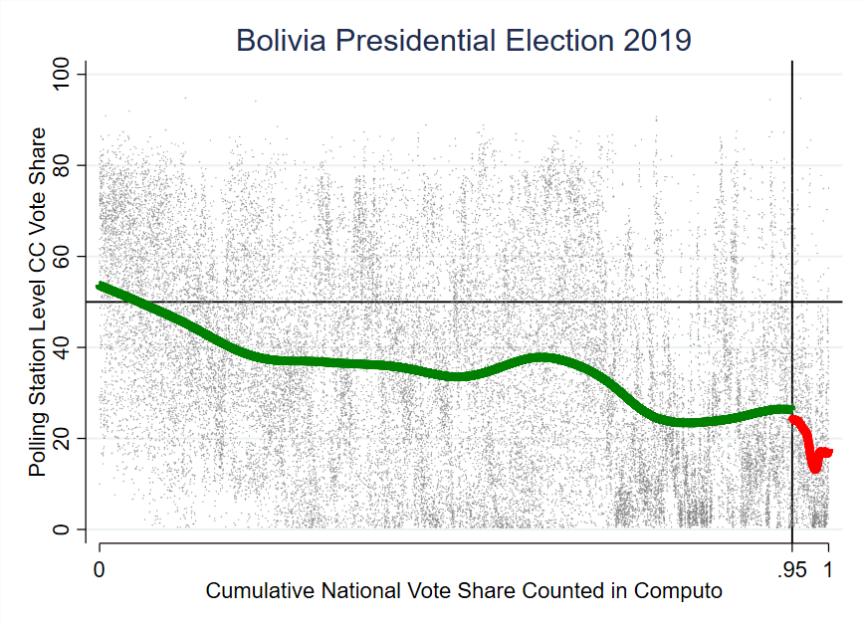


As above, we see the divergence between MAS and CC widen rapidly as the vote count proceeds. Again, this cannot be easily explained away by "late-reporting rural areas" since we are using the *computo* time stamps.

Consider only the MAS and CC trend lines. Here we replicate the threshold analysis but now use the 95% threshold calculated using only the *computo* data and time stamps.



The MAS trend shows a striking upward trend in the final 5% that is quite different from any other part of the trend. In addition, below, the CC trend shows a striking downward trend that, again, is distinct from its earlier trend.



Finally, a polling-station level analysis using only the *computo* time stamps confirms the trends uncovered in the earlier analysis.

	PS-Level MAS Vote Share		PS-Level CC Vote Share		MAS Advantage Over CC	
	0-95	95-100	0-95	95-100	0-95	95-100
National	44.6	59.7	35.4	18.9	9.2	40.9
Beni	33.3	39.2	33.1	23.5	0.2	15.7
Chuquisaca	34.1	63.7	46.6	19.0	-12.5	44.7
Cochabamba	55.1	71.1	32.1	16.4	23.0	54.7
La Paz	51.0	53.6	28.6	18.9	22.4	34.7
Potosi	42.7	71.6	33.2	8.7	9.5	63.0
Santa Cruz	32.6	50.6	45.4	25.4	-12.8	25.2

Source: Computo data and time stamps used to calculate cumulative vote thresholds; author's calculations

The patterns are similar to those in the table above. In every department where there are substantial numbers of polling stations reporting late, the MAS does much better in the final 5% of the vote count than in the previous 95%, while the CC does worse. Consider the final two columns, which calculate the average polling-station-level advantage enjoyed by MAS. In *Beni*, where the two candidates are roughly even throughout the count for the first 95% of the cumulative vote, the MAS has an average 15% edge in the last 5%. In *Chuquisaca*, the CC had an average 12% edge at the polling station level for the first 95% of the vote, but this flips and the MAS takes a 44% edge on average in the last 5%. That's a 50% average vote share reversal for the two parties.

One final piece of evidence comes from the OAS's internal analysis of the Computo trends. The table below shows the vote shares for both parties per the *computo* data with time stamps.

Date	Time	Cumulative votes counted	Tally sheets	CC	Votes	MAS	Votes	Difference	Votes
10/22/2019	**14:45**	86.90%	30.028	38.93%	2,100,493	44.75%	2,417,553	**5.87%**	317.060
	15:55	88.32%	30.520	38.64%	2,114,979	44.95%	2,460,336	**6.31%**	345.357
	16:19	89.25%	30.842	38.52%	2,128,833	45.07%	2,490,820	**6.55%**	361.987
	16:43	89.56%	30.948	38.46%	2,134,204	45.14%	2,505,344	**6.68%**	371.14
	16:58	89.80%	31.032	38.42%	2,137,218	45.16%	2,512,239	**6.74%**	375.021
	17:15	90.38%	31.230	38.29%	2,145,161	45.27%	2,536,075	**6.98%**	390.914
	17:30	90.97%	31.433	38.13%	2,152,747	45.42%	2,564,282	**7.29%**	411.535
	17:50	91.86%	31.743	37.95%	2,160,558	45.62%	2,596,893	**7.67%**	436.335
	18:10	92.30%	31.893	37.83%	2,163,988	45.73%	2,615,754	**7.90%**	451.766
	18:40	93.22%	32.211	37.61%	2,170,993	45.93%	2,651,695	**8.32%**	480.702
	19:30	94.42%	32.627	37.38%	2,180,479	46.14%	2,695,658	**8.76%**	515.179
	20:00	95.12%	32.867	37.23%	2,190,431	46.28%	2,722,762	**9.05%**	532.331
	20:15	95.40%	32.966	37.18%	2,191,909	46.33%	2,731,116	**9.15%**	539.207

	20:45	95.47%	32.988	37.18%	2,193,177	46.33%	2,733,300	**9.15%**	540.123
	21:20	95.63%	33045	37.17%	2,196,269	46.34%	2,738,409	**9.17%**	542.14
	22:12	95.87%	33162	37.13%	2,199,385	46.38%	2,747,770	**9.25%**	548.385
	22:47	96.09%	33204	37.1%	2,203,214	46.41%	2,755,609	**9.31%**	552.395
10/23/2019	**12:00**	96.64%	33395	37.03%	2,211,946	46.47%	2,775,791	**9.44%**	563.845
	17:42	97.41%	33555	36.86%	2,215,732	46.67%	2,805,669	**9.81%**	589.937
	18:36	97.46%	33677	36.85%	2,216,137	46.68%	2,807,438	**9.83%**	591.301
	19:22	97.48%	33683	36.85%	2,216,356	46,68%	2,807,945	**9.83%**	591,549
	21:22	97.52%	33697	36.84%	2,216,616	46,69%	2.809,399	**9,85%**	592,783
	22:14	97,57%	33715	36,84%	2,217,333	46,69%	2,810,631	9,85%	593,298
	22:40	97,60%	33725	36,84%	2,217,906	46,69%	2,811,429	9,85%	593,523
10/24/2019	**12:12**	98,02%	33870	36,76%	2,220,895	46,76%	2,824,615	**10.00%**	603,720
	8:50	98.42%	34010	36.70%	2.224,285	46,83%	2,837,821	**10,13%**	613,536
	11:40	98.82%	34146	36.61%	2,226,219	46.93%	2,853,465	**10.32%**	627.246
	15:40	99.16%	34.264	36.59%	2,230,689	46.96%	2,862,786	**10.37%**	632.097
	17:20	99.70%	34.453	36.54%	2,237,466	47.04%	2,880,470	**10.50%**	642.004
	18:45	99.89%	34.516	36.52%	2,239,240	47.07%	2,886,600	**10.50%**	647.360
10/25/2019	**9:03**	100%	34.555	36.51%	2,240,920	47.08%	2,889,359	**10.57%**	648.439

Source: Prepared by audit team based on Computo data

The difference between the two candidates grows rapidly over the final 15% of the vote count but, as identified above, the final 5% of the *computo* vote count is critical. In that time span, the MAS advantage goes from just under 9% to 10.57%, which requires the addition of about 120,000 votes to its advantage over the CC. How does this happen? Well, in that final 5% of the vote count, the MAS's vote count grows by 167,000 votes, but the CC's vote count grows only by 50,000. It is this great divergence, unpredicted and unanticipated by any previous part of the election trends, that pushes MAS over the 10% margin to outright victory.

In conclusion, our analysis of polling-station-level data from Bolivia's 2019 elections makes clear that the incumbent President's outright victory was statistically unlikely and only made possible by a massive and unexplainable surge in the final 5% of the vote count. Without that surge, while Mr Morales would still have been the largest vote-getter, he would not have crossed the 10% margin that is the threshold for outright victory. This surge required significant breaks in the trend-lines at the national and department level for the performance of the MAS and CC candidates. The size of the breaks is extremely unusual and strains credulity.