



## Agenda

- Item 3: Report of the activities carried out to date since the last meeting of the Coordination Committee**

### **REPORT OF THE ACTIVITIES CARRIED OUT TO DATE SINCE THE LAST MEETING OF THE COORDINATION COMMITTEE**

(Presented by the Secretariat)

<b>SUMMARY</b>	
This paper presents information on the progress made in the implementation of the activities agreed upon at the last meeting of the Coordination Committee (RCC/20) and to be included in the 2017 work plan.	
<b>REFERENCES</b>	
<ul style="list-style-type: none"><li>• REDDIG Contract 22501200;</li><li>• Report of the Twentieth Meeting of the REDDIG Coordination Committee (RCC/20) (Lima, Peru, 21 to 23 March 2017);</li><li>• Nineteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/19) (Lima, Peru, 22 to 26 May 2017); and</li><li>• Sixth Meeting on the Technical-Operational Implementation of the REDDIG II (RTO/6) (Manaus, Brazil, 12 June 2017);</li></ul>	
<b>ICAO Strategic Objectives:</b>	<i>A - Safety</i> <i>B – Air navigation capacity and efficiency</i>

## **1. Background**

1.1 The main activities agreed upon at the last meeting of the Coordination Committee (RCC/20) to be included in the 2017 work plan and additional to those pertaining the operation, support and maintenance of the network, were the following:

- a) REDDIG II training programme;
- b) REDDIG II operation and analysis to the implementation of new services.

1.2 Likewise, this working paper presents REDDIG logistics aspects during 2017.

## 2. Analysis

### REDDIG II TRAINING PROGRAMME

2.1 With regard to training activities, the following courses were carried out:

- a) Advance Course of the REDDIG Operations
- b) Course on IP Networks applied to the REDDIG II
- c) Course on Network Fundamentals (basic) for the staff of NCC Manaus

#### *Advance Course of the REDDIG Operations*

2.2 This course was addressed to the technical personnel responsible for the operation and maintenance of the REDDIG II station that received the respective basic courses. Among the aspects that were discussed, emphasis was placed on the operation and supervision of the Skywan 1070/7000 modem with a theoretical-practical description of the 'Line Up Manager' software as well as the 'troubleshooting' of the station's components. In **Appendix A** of this working paper, the content of the "Advanced Course of the REDDIG II Operations " is presented.

2.3 This course was held from June 13 to 16, 2017 at the facilities of the Instruction and Technical Update Section (SIAT) of the Fourth Integrated Center for Aerial Defense and Air Traffic Control - CINDACTA IV, Manaus, Brazil. For this event a fellowship was granted per member state of project RLA/03/901 and simultaneous interpretation was available.

2.4 The course was attended by 36 delegates from the States of Argentina, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Trinidad & Tobago and Venezuela. The digital version of the content was provided to the participants of the course, as well as complementary electronic files.

#### *Course on IP Networks applied to the REDDIG II*

2.5 The course was addressed to the technical staff with knowledge of IP networks, who participated in the courses "*Interconnecting Cisco Network Devices Part 1 (ICND1)*" and "*Interconnecting Cisco Network Devices Part 2 (ICND2)*", and who has the responsibility of operation and maintenance of the REDDIG II station.

2.6 It was carried out from November 13 to 17, 2017 in the facilities of the Instruction and Technical Update Section (SIAT) of the Fourth Integrated Center for Aerial Defense and Air Traffic Control - CINDACTA IV, Manaus, Brazil. For this event a fellowship was granted per member state of project RLA/03/901 and simultaneous interpretation was available.

2.7 The content was based on the topics (Lessons) of the Cisco ICND1 and ICND2 courses but focused on the equipment and services that are currently offered in REDDIG with virtual laboratories using the "Packet Tracer". The content of the course is described in **Appendix B**.

2.8 The course was attended by 24 delegates from the States of Argentina, Brazil, Chile, Guyana, Paraguay, Suriname, Trinidad & Tobago and Venezuela.

#### *Course on Network Fundamentals (basic) for the staff of NCC Manaus*

2.9 This course addressed to the personnel who carry out their daily tasks in the NCC Manaus

and who corresponds to the commitment of ongoing training to which the project is committed. This course was not included in the activity plan considered in the RCC/20, but it was considered necessary to carry it out. It did not represent any cost to the project

2.10 The purpose of the course was to renew and complement the fundamental and advanced concepts in transmission systems used in the transport of voice and data applied to civil aviation.

2.13. The proposed course outline was based on the fundamentals of networks oriented to the aeronautical applications on IP of project RLA/03/901 of the ICAO SAM Office; in the CCNA (Cisco Certified Networking Associate) theoretical-practical course Networking Fundamentals, and from different sources which address issues in telecommunications in a logical way. The description and content of the course is detailed in **Appendix C**.

## REDDIG II OPERATION AND ANALYSIS TO THE IMPLEMENTATION OF NEW SERVICES

### *REDDIG II Brasilia Node*

2.15 The node of Brasilia started its operations on April 2016, however during its operation some news that had to be corrected were observed.

2.16 In that sense, a mission to Brasilia was held from 16 to 25 October, 2017 with the participation of the REDDIG Administration, INEO Company and staff of CINDACT I.

2.17 The tasks are described under the following topics:

- a) checking the status of the serial cables and checking the operation of the B chain;
- b) inconveniences with maintenance and administrative voice circuits
- c) verification of coaxial cabling
- d) causes of packet loss in the Skywan A modem
- e) verification of the operation of the Gorgy timing
- f) backup procedure of servers on external disks
- g) general and integrated checking of the station and its components operation

2.18 The description of the tasks performed is detailed in the **Appendix D**.

2.19 The tasks carried out during the mission solved the last problems and inconveniences pending in the REDDIG II node of Brasilia, and it is still pending to definitively solve an inconvenient with the 10Mhz connection. However, a temporary solution was implemented by installing a DC-Block on the Tx path of the connection of 10MHz. A DC-Block was not enough.

2.20 This DC Block needed to be replaced by four definitive DC-Blocks, adapted to the frequency range of the REDDIG system; for which INEO sent to the SBBR site four DC Blocks BLK-6-N + (Mini-Circuits). These were finally installed on January 10, 2018, leaving the Brasilia station with all the problems resolved (See **Appendix E**).

### *REDDIG II Nodes*

2.21 During the mission in Brasilia, other issues related to the general network were attended.

2.22 In this regard, in addition to the tasks assigned and proper to the Brasilia node, the following issues were addressed:

- a) Verification of the operation of the Venezuela and Ecuador NMS
- b) Analysis of instability in the operation of Venezuela
- c) Support for NDSatCom
- d) Verification of the La Paz node functioning
- e) Disadvantages in the Ezeiza station
- f) Establish a procedure for calculating bandwidth consumption

2.23 In the particular case of Ezeiza, it follows to an event that occurred and coincided with the mission period, and that was a product of the weather conditions that affected the station during the night from October 18 to 19, 2017.

2.24 Regarding the support for NDSatCom, it refers to the tasks that were carried out to facilitate the remote access of the personnel of said company, to the modem Skywan A of Manaus to intervene in the novelty freezing period suffered by this equipment. The description of the tasks performed is detailed in Appendix D.

#### *IBUC news of Suriname and Modem of Bolivia IBUC*

2.25 On October 17, 2017, the IBUC B of the Paramaribo node (Suriname) went out of service. Although all the inherent actions were carried out to recover the operation of the equipment, it was necessary to coordinate with INEO to send it to be repaired in the factory and send a IBUC 80W spare part equipment as a replacement from the Regional Office in Lima. The logistics operation was registered as event OR-17005, with document SAMRO-77. The equipment is at Customs, in Paramaribo, for its dispatch from December 27, 2017

2.26 In view of this critical situation, the Regional Office sent a note to the Suriname Administration (Ref. SA5037), in order to accelerate the process that allows for the aforementioned spare part equipment to be available as soon as possible.

2.27 El equipo con falla fue enviado desde Bolivia, por intermedio de INEO, a fábrica para su reparación. Regarding the modem of La Paz (Bolivia), it presented errors on June 15, 2017. This event generated the OR-17003 logistics operation, with document SAMRO-75 (June 21, 2017), with the purpose of replace the equipment with error. The modem sent from the Regional Office to La Paz, after several logistical complications in Bolivia, was finally received in November and installed at the station on November 20, 2017. The equipment with error was sent from Bolivia, through INEO, to the factory for repair.

#### *Level 3 terrestrial network*

2.28 Regarding the work that has been done in cooperation with the Regional Office, Level 3 and the REDDIG Administration to achieve a stable and reliable terrestrial network, it should be mentioned that on August 8, 2017, a meeting was held in the ICAO SAM Regional Office, with Eng. Oliver Quiñones, Service Client Manager of Level 3, where issues related to the performance of the MPLS VPN terrestrial network were discussed.

2.29 The topics were as follows:

- 1) Definitive solution to the novelties of the nodes

- 1.1) Manaus (Brazil)
- 1.2) Paramaribo (Suriname)
- 1.3) Maiquetia (Venezuela)
- 1.4) Piarco (Trinidad & Tobago)
- 1.5) Extended periods for solution

2) Level 3 Portal

- 2.1) History discrepancies
- 2.2) Access to the portal for the staff of the States
- 2.3) News on: time zone (GTM), duration of the novelty, responsible, status of the ticket
- 2.4) Lack of nodes in the options presented in the portal (in general Brasilia is missing) Network Access Points (NAPs)).

3) Service Desk

- 3.1) Update

4) Contacts matrix

- 4.1) Update

5) Last miles

- 5.1) Provide ICAO with the topology with the corresponding information (provider, type of link, NAPs (Network Access Points), etc.)

6) Credit notes

- 6.1) Verify if the credit notes are being prepared based on the reported monthly availability
- 6.2) Analyze, monthly, the availability discrepancies according to the SLA

2.30 Although the activities referred to the novelties are developed and described in **Appendix F**, some general questions on this subject are briefly commented on (in particular, there were news in Manaus and Maiquetia that were very repetitive).

2.31 It was concluded that, if the portal information is used to calculate the unavailability, Level 3 should correct some items because the events are not being recorded accordingly. In addition, if it is the way to obtain unavailability, it is not an acceptable method due to the discrepancies observed. Level 3 has been working on the issue and this situation has improved markedly.

2.32 The portal shows, in general, the presentation of the information according to the tickets, the information presented is not precise. Although some issues of the portal have been corrected, is still not very functional, since the information is not reliable. It can only be used to verify tickets and manage users. It should be clarified that the report presented in Appendix F was prepared in September 2017 and that to date several of the situations presented have been improved.

2.33 Nevertheless, the complaints are carefully monitored and all the events related to the novelties presented by the nodes are recorded. Discrepancies that arise before an event are manifested and highlighted.

2.34 The staggering of Level 3, provided in the contact matrix, is used to speed up the lack of problem solving.

2.35 The criticality of the events that arise is informed to Level 3 at all times, and the imperative need for the company to comply with the optimum availability required.

2.36 The actions carried out and to which they are given continuity are described as follow:

- a) Establish a constant dialogue with the company Level 3 in order to correct the novelties observed by working together.
- b) Penalize the Level 3 company for the observed breaches.
- c) If this is the case, require the Level 3 company to change the local provider or reform the last mile connections, ensuring a high redundancy and eventual desired availability.
- d) Keep the contact matrix up-to-date, follow up on the news that has arisen, and coordinate with the technicians of the local nodes.

2.37 Regarding the monthly unavailability in the terrestrial network (LEVEL 3), are presented in **Appendix G**. One of the tasks carried out and in force was the update of the Matrix of Contacts made in August 2017 which is shown in **Appendix H**.

2.38 One of the improvements observed in the recent months is the addition of the Century Link system as of November 1, 2017. This system facilitates the automatic generation of tickets and has facilitated rapid identification in the presence of a novelty in the terrestrial network.

*Final acceptance tests (FNAT) of the REDDIG*

2.39 The provisional acceptance tests of the REDDIG II (document PSAT - NAT - 2022 NT - 2141167C Rev. H) were carried out from January 31 to February 05, 2015. Once the tests were concluded, the focal points of the Member States of the REDDIG II proceeded to sign the PSAT certificate with comments on each of the nodes.

2.40 The results of the PSAT tests with the comments on each of the nodes were registered in the PSAT document (version H). This document was published on the following web page [www1.lima.icao.int/reddig](http://www1.lima.icao.int/reddig).

2.41 According to article 13.1 of contract No. 2250120 (Provision of a new regional telecommunications network (REDDIG II)), the INEO & Level 3 consortium had a period of 40 days to correct the deficiencies found in the PSAT. In the 40-day period, the INEO & Level 3 consortium proceeded to correct many of the deficiencies with the exception of the following major failures:

- Random freezing of the satellite modem (Skywan ID 1070) in some of the REDDIG II nodes
- Random freezing of the satellite modem of Manaus chain A (Skywan ID 7000)

2.42 These major errors, the INEO & Level 3 consortium completed at the end of 2017. In this sense, from January 29 to 30, 2018, the final acceptance tests of the REDDIG II (FNAT) were carried out. On January 30, the FNAT certificate was signed. This activity was carried out at the CINDACTA IV facilities in Manaus, Brazil, where the REDDIG II node in Manaus and the NCC are located.

2.43 The FNAT was carried out by: i) the head of the REDDIG II project, Mr. Onofrio Smarrelli (CNS Regional Officer of the ICAO SAM Office); the Administrator of REDDIG II, Mr. Javier Vittor; and, representatives of INEO. The FNAT report and the certificate are presented as **Appendix I** to this working paper.

*Implementation of REDDIG II new services*

2.44 From the RCC/20 to date, the following AMHS circuits were implemented and entered into operation in REDDIG II:

Brasilia - Bogota (May 2017)  
 Brasilia - Georgetown (July 2017)  
 Bogota - Caracas (December 2017)  
 Brasilia - Caracas (March 2018)

2.45 Likewise, other AMHS circuits were implemented, which are not yet in operation. It is expected that they will start operating during 2018:

Ezeiza - Brasilia  
 Ezeiza - Lima  
 Ezeiza - Santiago  
 Ezeiza - Montevideo  
 La Paz - Lima  
 Lima - Guayaquil  
 Bogota - Guayaquil  
 Caracas - Guayaquil  
 Bogota - Panama (Interconnection MEVAIII REDDIG II)  
 Brasilia - Montevideo

2.46 In addition, connections were made at the network level for the exchange of radar data between:

Ezeiza - Santiago  
 Ezeiza - Asuncion

It is expected that, in the course of 2018, the exchange of radar data between the indicated locations will enter the operational phase.

*REDDIG logistic aspects*

2.47 The logistical operations, mainly originated by breakdowns in the node, include the delivery of equipment or spare parts from the REDDIG storage site, located in the ICAO SAM Regional Office in Lima, or from any other node, to the node requiring them, including coordination with the factories for the repair of the equipment, payment for any transportation and costs involved, as well as coordination and support to States for any import and export involved.

2.48 Since the RCC/20 to date, five (5) logistic operations were carried out with the new REDDIG II. The summary of equipment failures and spare parts is shown in **Appendix J** to this working paper.

2.49 The **Appendix K** presents the statistics corresponding to the number of the main

attentions to the nodes of the network, as well as their distribution in terms of the type of equipment that originated the attention service since the RCC/19.

2.50 The **Appendix L** presents the table of network availability from the year 2004 until the end of the year 2017.

## OTHER MATTERS

### *RTO-06*

2.51 The Sixth Technical-Operational Meeting of the REDDIG II (RTO/6) was held on June 12, 2017 at the Technical Training and Update Section (SIAT) of the Fourth Integrated Center for Air Defense and Control of the Air Traffic - CINDACTA IV, Manaus, Brazil.

2.52 The meeting was attended by 11 member States (Argentina, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Trinidad & Tobago and Venezuela) with a total of 40 participants, including ICAO specialists. During the development the following subjects were reviewed:

- a) Performance of REDDIG
- b) Review and update of procedures for the maintenance and operation of REDDIG
- c) Analysis of security in REDDIG and its recommendations
- d) Purchase of redundant equipment (router / firewall / switch) to standardize the connection and security in the REDDIG
- e) Other matters: it should be mentioned that it was considered convenient to form working groups in different areas, technologies and according to the experiences of the personnel of each State.

## **3 Suggested action**

3.1 The Coordination Committee is invited to:

- a) take note of the information provided;
- b) analyze the activities carried out since the RCC/20 to date that are presented in section 2 and in the corresponding Appendixes to this working paper.

**ADVANCED COURSE OF OPERATION OF THE REDDIG**  
Manaus, Brazil, 13th to 16th June 2017

**CONTENTS**

**1. Architecture**

- Satellite network
- Support ground network
- Plan for Addressing IP (Global and domestic)

**2. RF Equipment**

- IBUC + LNB
- Redundancy
- Supervision/Configuration via HHT, TCP/IP (Web) and Telnet

**3. Modem Skywan**

- Model 7000
- Model 1070
- Access via “LineUp Manager”
  - Software Upload
  - Set Parameters
  - Tests
  - Operations
  - Monitoring Screens
  - Log Files
- Performance, analysis of parameters

**4. Ethernet Switch Netgear**

**5. Router Cisco**

- Interfaces
- VRRP redundancy protocol
- OSPF routing protocol
- VLANs
- Commands on line
- Interfaces monitoring
- Settings

**6. Baseband Commuter (RSS) and “Patch Panel”**

**7. NMS – WhatsUp Gold**

- NMS Central Server
- NMS Remote Server (Local)
- Web access
- Modules and displays
- Monitors
  - Active Monitor
  - Performance Monitor
- Alarms

**COURSE ON IP NETWORKS APPLIED TO THE REDDIG II**  
(Manaus, Brazil, 13 to 17 November 2017)

**CONTENTS**

**Day 1**

**1. InternetNetworking**

- OSI model and TCP / IP model
- Basic functions of the physical layer, link, network and transport
- Encapsulation, PDU overhead

**2. Operation of the Cisco IOS software**

- Characteristics and functions
- CLI User and Privileged modes
- Basic commands on privileged mode
- Help commands
- Error messages (logs)
- Types of router memories
- Presentation on router hardware and switches used in REDDIG

**3. LAN**

- Collision domain and broadcast
- Differences between hubs and switches
- Frame Ethernet
- Mac Address and types of network communications (unidissemation / broadcast / multicast)
- Frame routing in a switch
- Full-Duplex and half-Duplex modes and speed (troubleshooting)
- Hardware y software features of the Netgear switch

**4. VLAN**

- Importance of the VLANs
- Frame Ethernet 802.1q
- Types of VLAN interfaces (trunk / Access)
- Native VLAN in a port
- STP
- Configuration of VLANs in Netgear
- REDDIG VLANs mapping

**5. VLANs (Packet Trace and Netgear) configuration laboratory**

## Day 2

### 1. IP addressing

- IP header
- IP addressing types (compare with REDDIG addressing)
- Subnetting / Masks
- VLSM
- REDDIG IP addressing structure
- IP addressing laboratory / Subnet

### 2. Transportation layer

- TCP / UDP differences
- ¿Which REDDIG applications use TCP and UDP?

### 3. Initial configuration of a router and a switch

- Initial logical configuration of the Cisco router and Netgear switch
- Interface and administrative IP addressing
- Software licenses
- Types of router access
- CDP / LLDP
- ARP
- Brief example on how a package travels in a switch and router network

### 4. VRRP

- Operation
- Advantages
- REDDIG VRRP configuration
- Priority
- IPSLA Tracks

### 5. IP routing

- Router operation
- Features of a Cisco router (CEF)
- Path determination and routing table
- Administrative distance
- Route types (direct, static, dynamic and default) – show the REDDIG routing table as reference

## Day 3

### 1. Static routing

- Advantages and disadvantages of static routings
- Manners for the configuration of static routes (next-hop / interface)
- Default routes
- Configuration of static routes in REDDIG (Level-3)
- Show IP route

### 2. Dynamic routing

- Areas
- Router types in OSPF (DR, BDR, ASBR, ABR)
- LSDB / SPF / Hello
- Vicinity and adjacency (see REDDIG router)
- Status of an interface with adjacency
- DR / BDR selection
- LSA / LSA types
- Troubleshooting commands
- SH IP OSPF information, REDDIG router data base
- SH IP OSPF neighbours status

### 3. Inter-VLAN routing

- VLAN routing objectives
- VLAN routing s in the REDDIG trunks

### 4. Laboratories involving static, dynamic and inter-VLAN routing

## Day 4

### 1. Access lists

- Use of ACLs
- ACL types
- Construction of ACLs
- Wildcards
- ACLs used in REDDIG

### 2. NAT

- Use of NAT
- NAT types (static, PAT)
- Use of NAT in REDDIG

### **3. QoS**

- Importance
- Basic parameters of a network (jitter, delay, loss of packages)
- Diffserv
- Traffic classification
- Policers
- QoS application in interfaces
- Troubleshooting commands for QoS
- QoS configuration in REDDIG Cisco routers

### **4. Traffic tunnelling**

- Operation
- BSTUN
- GRE
- Tunnel configuration in REDDIG

### **5. Laboratories involving ACL, NAT, QoS and tunnels)**

## **Day 5**

### **1. VOIP**

- Analogue and digital interfaces
- Basic protocol concepts in SIP signalling
- Codec types
- VOIP configuration in Cisco
- Call-manager
- Dial-peers
- Translation rules
- VOIP configuration in REDDIG

### **2. WAN technologies**

- Link layer protocols
- Point-to-point link configuration
- Configuration of WAN links in the SkyWAN modems
- Configuration of routing protocols in SkyWAN modems

### **3. MPLS**

- Basic operation concepts of the service provider MPLS network
- REDDIG traffic routing through the Level-3 MPLS network

**NCC REDDIG MANAUS****CURSO  
FUNDAMENTOS DE REDES  
(BÁSICO)****PROGRAMA DE CAPACITACIÓN PARA PERSONAL NCC MANAUS  
Y PROGRAMA DE ESTUDIO****1- INTRODUCCION**

Teniendo en cuenta los continuos y rápidos avances de la tecnología en las Telecomunicaciones y redes, aplicados específicamente a la aviación civil, se hace necesario que el personal técnico, involucrado con aplicaciones de las mencionadas tecnologías, se familiarice con conceptos que les permita afianzar los conocimientos adquiridos producto de la experiencia y trabajos diarios en sistemas de telecomunicaciones.

El curso de capacitación tiene como fin renovar y complementar los conceptos fundamentales y avanzados en sistemas de transmisión empleados en el transporte de voz y datos aplicados a la aviación civil.

El esquema del curso propuesto se basa en los fundamentos de redes orientados a las aplicaciones aeronáuticas sobre IP del proyecto RLA/03/901 de la SAM de la OACI, en el curso teórico-práctico CCNA (Cisco Certified Networking Associate), Networking Fundamentals y de diferentes fuentes las cuales tratan de forma lógica los temas en telecomunicaciones. Tales fuentes han sido probadas por muchas universidades con buenos resultados, complementado con protocolos y datos empleados para aplicaciones aeronáuticas, dándole un enfoque particular.

**2- OBJETIVO GENERAL**

Conocer la terminología, conceptos generales y específicos de los estándares de transmisión de voz y datos en redes basadas en tecnología TCP/IP, que emplea la REDDIG para el transporte de la señalización de los distintos sistemas aeronáuticos, incluso lo concerniente al transporte de datos radar.

**3- OBJETIVOS ESPECÍFICOS:**

Que el cursante (técnico) conozca los fundamentos de los protocolos LAN y WAN aplicados en el transporte de voz y datos (interfaces asincrónicas de datos RS232, la interface serial síncrona V35, fxs/fxo, asterix, etc).

Que el cursante pueda adquirir los conocimientos que permitan la utilización de los estándares establecidos para solucionar problemas de compatibilidad entre distintos fabricantes y unificar criterios para la implementación de sistemas de telecomunicaciones.

Familiarizarse con los protocolos TCP, UDP y los dispositivos de networking.

Que el cursante tenga una introducción para iniciarse en el estudio y análisis en el transporte de datagramas en redes IP.

Que pueda conocer y estudiar mediante simulación el intercambio de paquetes entre unidades de enrutamiento IP.

Comprender la relación de dichas tecnologías con las aplicaciones aeronáuticas.

Que el cursante tome conocimiento del funcionamiento del protocolo de control de enlace; HDLC, y aplicarlo a la transmisión de datos en formatos ASTERIX. Introducción a la configuración de enlaces asíncronos y síncronos.

Que el cursante pueda reconocer topologías y situaciones típicas de un escenario de networking.

Que el cursante pueda reconocer diferentes componentes a través de las diferentes actividades y prácticas de laboratorio de lo enunciado precedentemente.

**4- REQUISITOS:**

Personal técnico que preste servicios en el ámbito de competencia de las telecomunicaciones aeronáuticas del NCC Manaos.

**ESTRUCTURA DE CURSO:**

Para el logro de los objetivos propuestos, el curso se impartirá distribuido en capítulos centrales, incluyendo el desarrollo de contenidos teóricos y teórico-prácticos, existiendo correlatividad lógica entre los mismos.

**RÉGIMEN DE DICTADO:**

La capacitación se desarrollará en forma presencial, en módulos horarios de 90 minutos cada uno y con actividades como tareas a complementar para la siguiente clase.

**DURACIÓN DEL CURSO:**

El curso de Fundamento de Redes se desarrollará en el lapso de los 8 (Ocho) clases en días hábiles.

**METODOLOGÍA:**

El curso se desarrollará en forma presencial, y con tareas extracurriculares, mediante secciones de formación teórica en el aula, con participación activa del cursante por medio de análisis y solución de problemas en el área de estudio respectiva. Los conocimientos adquiridos serán aplicados en el laboratorio (o lugar adecuado para tal fin) donde el cursante simulará situaciones de desempeño y configurará parámetros en equipos y software, dando solución a los problemas propuestos.

La metodología incluye, además, lecturas de documentación técnica, exposiciones de los distintos temas y aprendizaje grupal, con discusión sobre las aplicaciones y casos de estudio propuestos.

Los cursantes tendrán a su disposición, en la web, todo el material necesario para poder complementar el curso. Este sitio contendrá la información necesaria conforme al marco teórico expuesto por el profesor en el aula.

Eventualmente se utilizarán herramientas en el mismo entorno web para poner a disposición los prácticos que se programen.

**EVALUACIÓN:**

**EXAMEN ESCRITO:** Se tomará un examen escrito integrador de todos los contenidos.

**AYUDAS DIDÁCTICAS:**

El contenido se desarrollará con el apoyo documental específico requerido en el presente documento.

Las clases se dictarán en aula equipada con pizarrón, elementos de escritura, borrador, bancos/escritorios para los alumnos, escritorio para el profesor. PC, cañón y pantalla de proyección/ En laboratorio, equipado con equipos de networking, se desarrollarán las prácticas con un máximo de dos (2) alumnos por grupo.

La metodología empleada se apoyará en los siguientes recursos hardware y software que estén disponibles.

**Nota:** Todo el software requerido será suministrado por el instructor; únicamente se requieren permisos de administrador local en cada equipo para su instalación. La información, software y accesorios serán alojados en el servidor o donde designe el personal de informática que brinde el soporte, con acceso a los cursantes y para uso exclusivo.

El material requerido anteriormente, no es imprescindible para el curso; eventualmente será coordinado con el personal responsable de cada lugar del dictado del curso para evaluar las ayudas con las que se contará en cada caso.

CONTENIDO (UNIDADES/TEMAS)	TEORÍA	PRÁCTICA
<b>Día 1</b>		
1.1. Estándares	20 min	30 min
1.2. Organizaciones estándares.	20 min	
1.3. Modelos	20 min	
<b>Día 2</b>		
2.1. Capas del modelo	50 min	30 min
2.2. Interconexión de capas.	10 min	
<b>Día 3</b>		
3.1. TCP/IP	10 min	30 min
3.2. Protocolos de Capa Física.	10 min	
3.3. Redes de Área Local.	20 min	
3.4 Capa Física, protocolos WAN	20 min	
<b>Día 4</b>		
4.1. Protocolos Nivel 2.	15 min	30 min
4.2. Protocolos Capa de Red.	15 min	
4.3. Enrutamiento.	30 min	
<b>Día 5</b>		
5.1. Capa de Transporte	10 min	30 min
5.2. Protocolos de Capas Superiores	10 min	
5.3. Herramientas de Diagnóstico	20 min	
5.4. Prácticas y ejercicios	45 min	
<b>Día 6</b>		
6.1. Notaciones	10 min	30 min
6.2. Matemática binaria	25 min	
6.3. Direccionamiento IP	25 min	
<b>Día 7</b>		
7.1. Introducción a la telefonía	10 min	30 min
7.2. Conceptos	10 min	
7.3. Equipos de Networking	15 min	
7.4. Prácticas y ejercicios	15min	
7.5. Troubleshooting	10 min	
<b>Día 8</b>		
8.1. Evaluación	1h30min	

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Mission overview

Date 24/10/2017

Confidential   Restricted  
 Free   Internal

Mission in Brasilia for REDDIG II network

Members                      Javier Vittor  
    Clement Chevallier

Nb. page : 42

From CHEVALLIER Clément

To    ICAO, INEO

This document describes the work achieved in REDDIG II node of Brasilia to solve the last pending issues and inconveniences in REDDIG II node of Brasilia and inconveniences throughout the network.

Summary

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1. Serial cable and chain B check in Brasilia .....	2
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### 1. Serial cable and chain B check in Brasilia

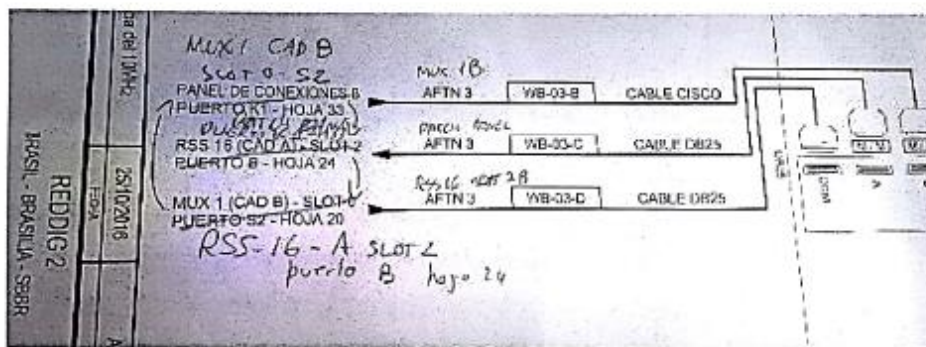
#### Serial cables

A doubt was expressed regarding serial port connection when working on chain B. Was exposed the fact that the NMS send the order to switch and not all the port might need to go to chain B depending on wiring and NMS configuration. An overview was anyway required from my side in order to fully understand the situation.

Drawings check appears to have mismatch with the current situation.

Mistake was observed on page 25 RSS B slot 2, exchange between description:

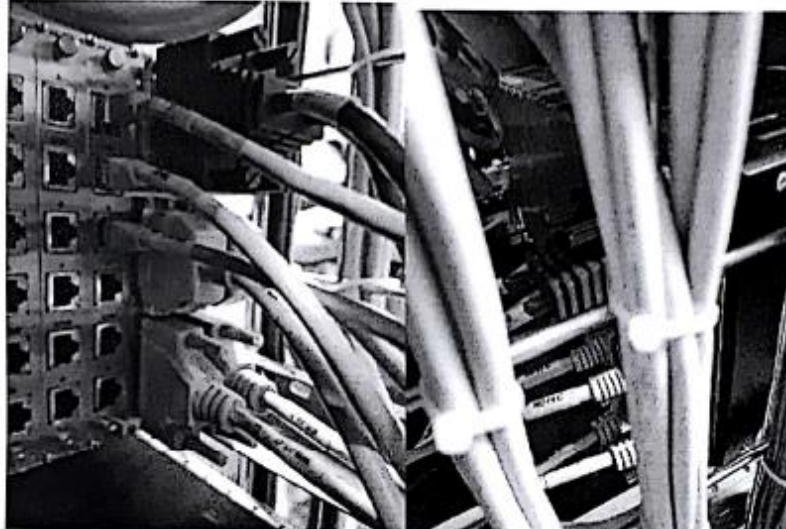
- Port.COM: RSS A Slot 2 port B page 24
- Port.A: PATCH PANNEL B – Port K1 page 33
- Port. B : MUX 1 channel B slot 0 S2.



*[Handwritten signature]*

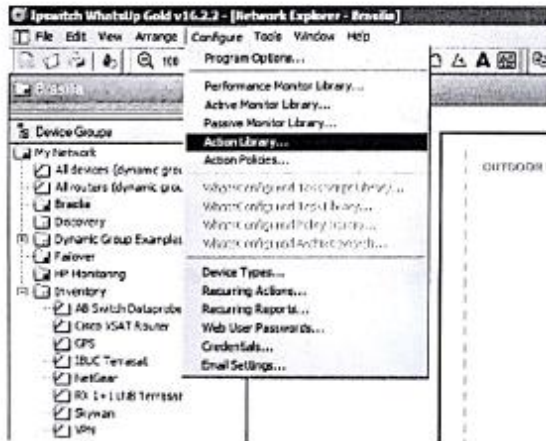


Cables were modified accordingly:



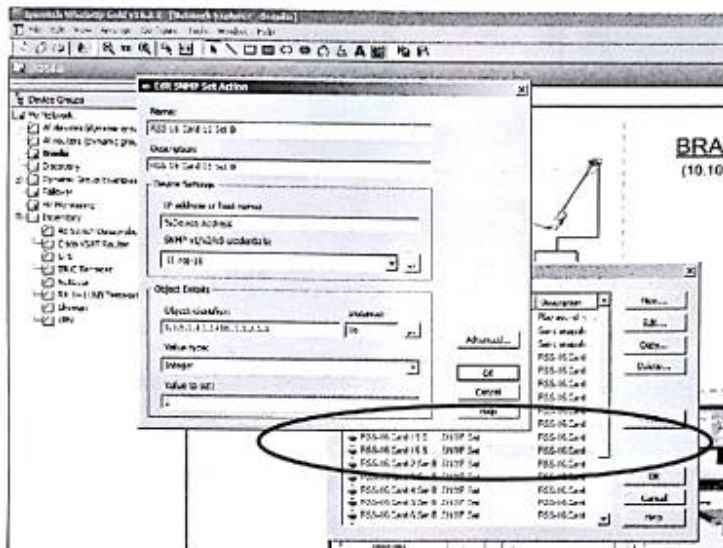
NMS check

The NMS was checked to see if all the ports were switched:



From the action library check if all the cards are present (16):

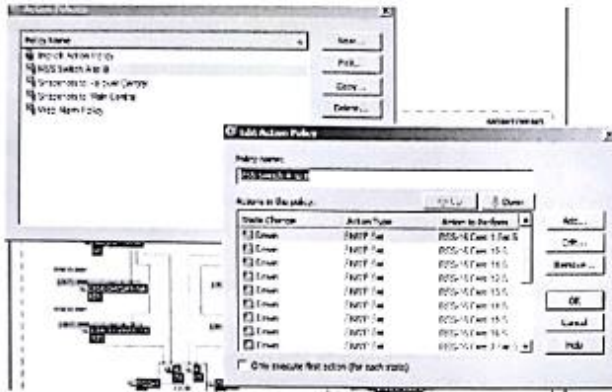
*[Handwritten signature]*  
CC



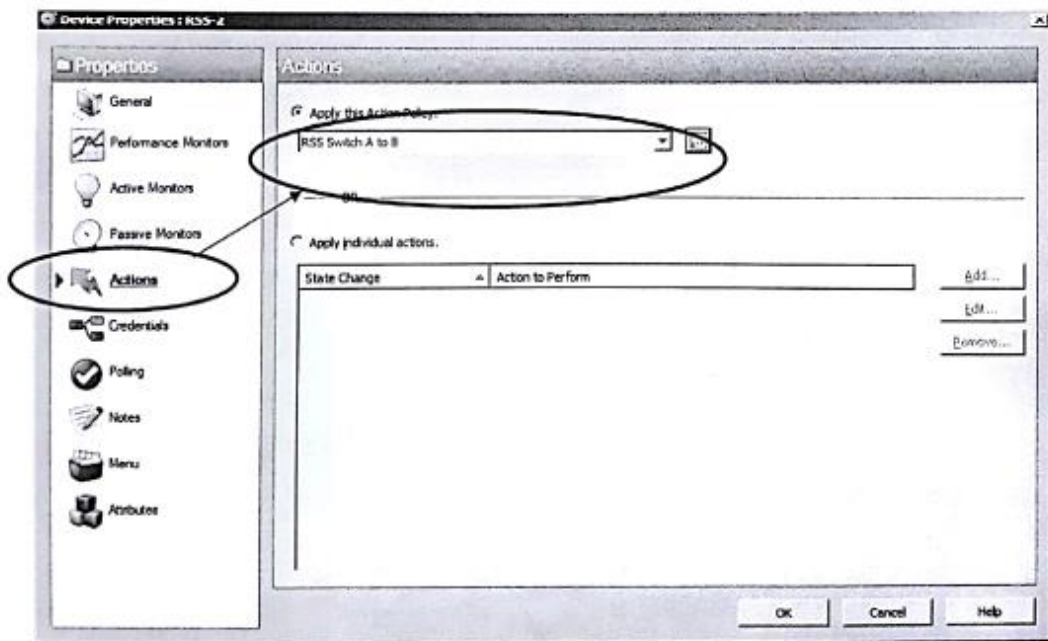
Then go to the action policies menu:



There, on the "RSS switch A to B" policy, check that all the ports are present:



Finally, on the RSS 1 and 2, check that this action is present :





Router configuration cleaning

On 18<sup>th</sup> of October, configuration were cleaned and reorganized at telephony level. An IP route was removed:  
Ip route 10.168.8.0 255.255.252.0 10.100.34.232

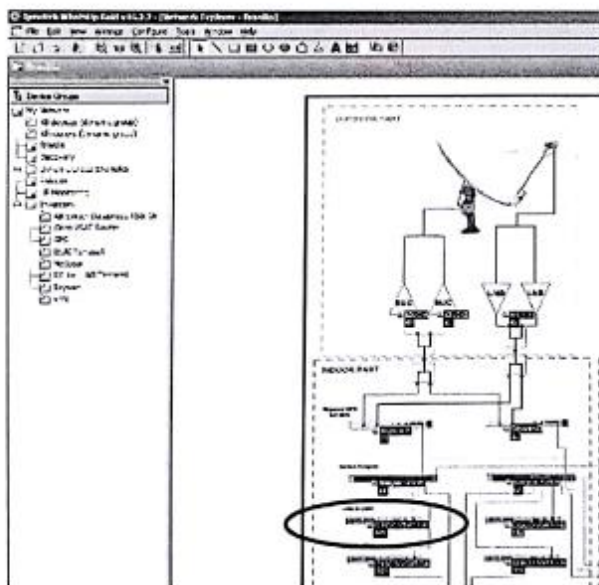
This latest IP is unknown.

We could see by the way that some dial peer voip were present and not required (they are both pots and voip). FXS telephone 23401 was pointing on chain B on a wrong port, so it was modified and checked.

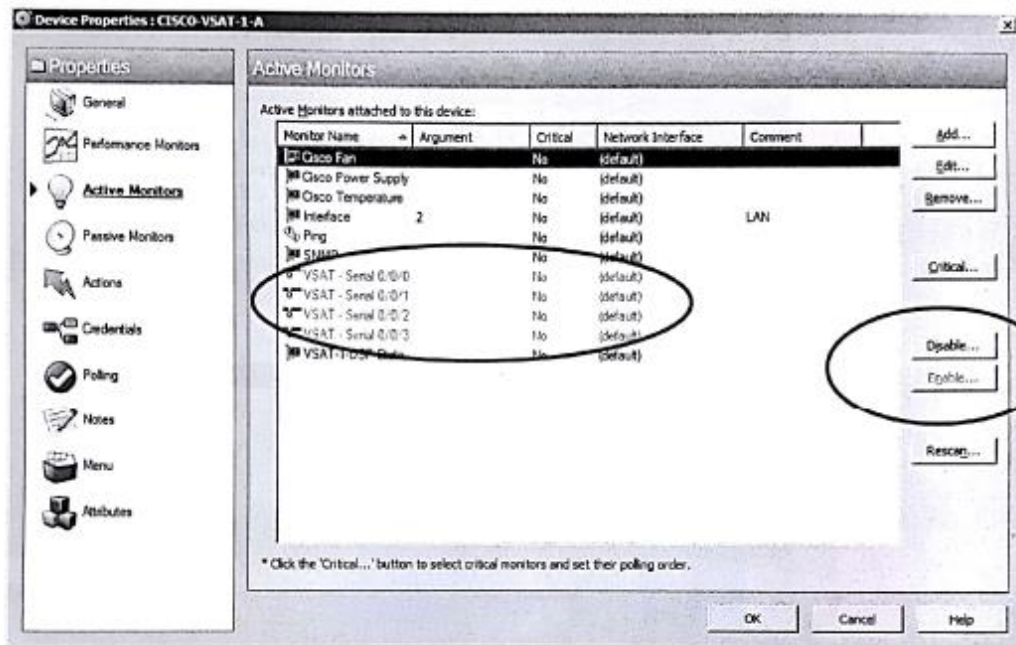
Inhibition of Serial ports polling on NMS

The serial port polling is achieved using a telnet/ssh command and not a SNMP polling. The What'supGold sends a "show" command a find a precise occurrence of a word.  
This process, identified as the only possibility to find the correct status of ports, did not result very successful and presents instability. The NMS shows the cisco in red dot, meaning an issue whereas there are not. Thus, the balance between no information and a partial/wrong information went in favour of no info, and the polling was disabled (it can be enabled any time).

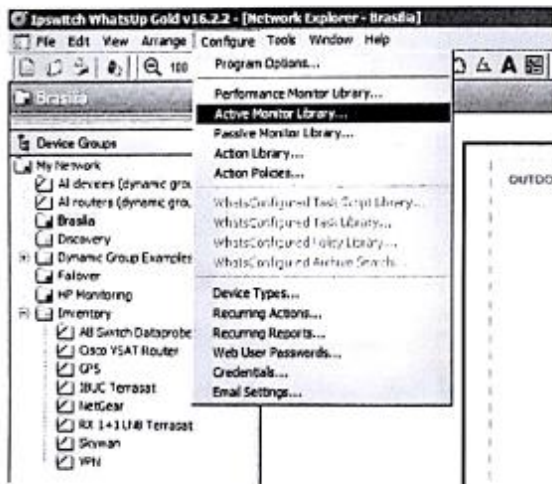
From the IpSwitch WUG admin console:



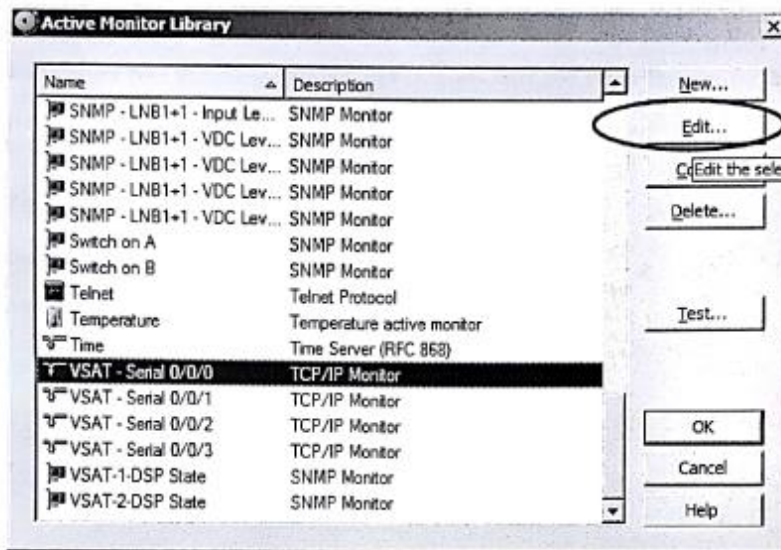
Access to the relevant cisco and go to "Active monitor", select the different serial ports and click on "enable" :



To modify this active monitor, go to the Active monitor library:

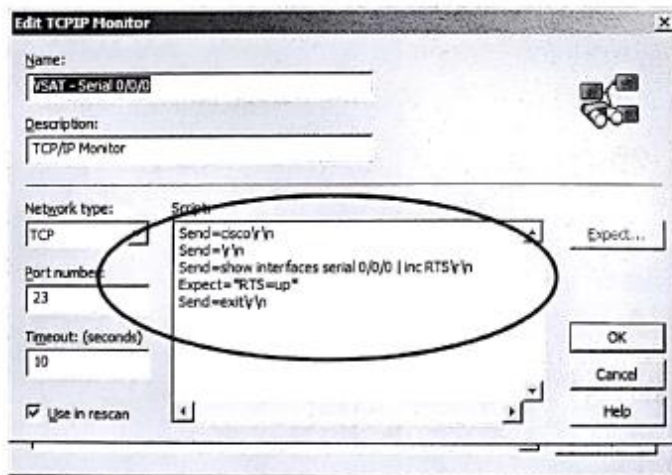


Then select the relevant line and clic on "edit":



There you can modify the different lien sent to the cisco. Here you find:

- 1) "cisco": username written to enter the cisco
- 2) " ": the password to enter the cisco (nothing)
- 3) "show interfaces serial 0/0/0/": the command line sent to the cisco
- 4) Expect" rts=up": the word that WUG is supposed to find.





### Communication with Recife

The telephone lines with Recife were not working. It was found that the configuration on SBRF-2 had some parts missing, referring to telephone up to Brasilia.

The relevant configuration was added (dial-peers 23401, 234...) and tested successfully.

So far 23801 is not ringing but this later seems to be permanently off hook, thus not reachable...

### Test on chain B

Chain B was tested with Manaus, AMHS and AFTN are ok.

On 23<sup>rd</sup> of October, the services were switched on chain B for long time check.

After more than 6 hours of service, no issue were reported.



## 2. Chile issue with maintenance and admin telephone lines

### First observation

Chile experiments troubles with the maintenance and admin lines, issue that occurred months ago. Those links used to work. Christian and Javier could establish a connection to Manaus and Ezeiza changing codec from G729br8 70 bytes to G729r8 bytes 20, the default codec.

I mentioned the fact that due to Teleconf configuration, Cisco 1 for Manaus and Ezeiza only handle G729r8 20bytes, as we cannot configure the teleconference with G729br8 70 bytes. As the dial peer voip is the same for teleconference and regular admin line, all the communication heading to Ezeiza 1 and Manaus 1 shall receive G729r8 20 bytes.

In order to have a clearer view of the situation we proceeded to a debug on Brasilia and Santiago:  
debug ccsip calls  
terminal monitor

We could place a call from Brasilia to Santiago (configured with codec G729br8 bytes 70) but could not place the call from Santiago to Brasilia.

On Santiago, the error was "no codec" on the negotiated part.

On Brasilia, we could see that the required or negotiated codec was G729r8 bytes 20.

A test was achieved, changing the paired dial peers voip in Santiago and Brasilia to G729r8 bytes 70, successfully. This behaviour is not common nor normal.

Santiago, is not supposed to use G729r8 if configured G729br8 in its dial peer voip. Configuration shall be changed in order to have G729br8.

### Resolution

It took us a long time to solve the issue, as the codec mismatch was not the root cause of the issue.

As the ATS calls (140XX) are well placed with no issue, thus a configuration issue regarding only the Admin line was likely. By the same reason, a codec translation locally at SCEL was unlikely. Even though, the local SIP UA and Cisco CME was removed from the config at SCEL, as we could suspect a bad configuration leading the CME to change the codec prior to place the call. This modification resulted unsuccessful. As a consequence, a more complex root cause is suspected.

The codec mismatch observed in SBBR is not the responsibility of SCEL. Indeed, the message displayed in the cisco router of SBBR with "codec G729r8 and 20 bytes" was the response of the local router to the SIP invite and not the SIP invite itself.

This could be observed with wireshark traces, where the sequence as displayed below, shows that SCEL asks for G729r8 bytes 70 (configuration was changed to as for r8 at that moment precise and not br8), and SBBR response to that with r8 and 20 bytes:

General view of the sequence (first SCEL then SBBR):

A handwritten signature in black ink, consisting of a stylized, vertical stroke with a loop at the top and a horizontal stroke at the bottom.









```

session protocol sipv2
session target ipv4:10.100.40.121
!
!
dial-peer voice 240000 voip
destination-pattern 240....
session protocol sipv2
session target ipv4:10.100.40.253
codec g729br8 bytes 70
!
dial-peer voice 240001 voip
preference 1
destination-pattern 240....
session protocol sipv2
session target ipv4:10.100.40.103
codec g729br8 bytes 70
!
dial-peer voice 240002 voip
preference 2
destination-pattern 240....
session protocol sipv2
session target ipv4:10.100.40.104
codec g729br8 bytes 70
!

```

These different dial peers have the possibility to overlap, as if I dial 2400055 for example I might match first 24000 and not 240....

Thus it could have been a possible issue. I first discarded it as I saw in the trace that 2404005 was used, but did not pay sufficient attention on the dial peer used for identifying the number at SCEL, when SCEL was calling.

Checking the config of SCEL, I could see that the E&M trunk have the following config:

```

!
voice-port 0/0/0
auto-cut-through
operation 4-wire
type 5
signal immediate
timing delay-start 1000
timing hookflash-in 0
timing seizure 30
shutdown
description ATS_2400081
station-id number 2400081
!
voice-port 0/0/1
auto-cut-through
operation 4-wire
type 5
signal immediate
timing delay-start 1000
timing hookflash-in 0

```

A handwritten signature in black ink, appearing to be "cc" or similar, located at the bottom right of the page.



```
timing seizure 30
description ATS_2400082
station-id number 2400082
!
```

And here is the issue. As the station-id is 2400081, the nwhn SBBR receives a call, it thinks the calling number is 2400081 and thus the corresponding dialpeer is 24000 and not 240..., and thus it uses the codec for this dial peer. The empty codec (default) is G729r8 bytes 20.

So the configuration was changed with a station-id of 2400881, and the issue was solved.

The sites that were in the same configuration were changed to avoid such trouble.

Voice-port 0/0/0 was disabled on Chain B, so it was enabled and works fine.

A handwritten signature in black ink, appearing to be "f" followed by "cc" below it.



3. Venezuela

Instability

SVMI was found unstable, the ping as a strong latency and jitter even locally between 1B and 2B routers. Chain B is active. Some message of Serial port connection blinking is present, and it might be the cause of a CPU high load: 60%.

(command show process cpu).

The cisco 1A has a high CPU load up to 60% even not connected.

```
SVMI-CISCO-VSAT-1-B-V15#term mon
SVMI-CISCO-VSAT-1-B-V15#
SVMI-CISCO-VSAT-1-B-V15#
SVMI-CISCO-VSAT-1-B-V15#
SVMI-CISCO-VSAT-1-B-V15#sh proc cpu
CPU utilization for five seconds: 67%/0%; one minute: 66%; five minutes:
PID Runtime(ms)   Invoked    uSecs    5Sec    1Min    5Min  TTY Process
  1          12         111       108     0.00%  0.00%  0.00%  0 Chunk Me
```

Thus, I first disabled the Serial port interrogation from the NMS to lower the load, and restarted chain A. Chain B should be restarted too to avoid this issue, and the appropriate cables checked:

```
SVMI-CISCO-VSAT-1-B-V15#term mon
SVMI-CISCO-VSAT-1-B-V15#
-0ct 19 13:44:11.584: %HWIC_SERIAL-3-LINEFLAP: Excessive modem signal transition
s detected on line 19
-0ct 19 13:44:20.272: %HWIC_SERIAL-3-LINEFLAP: Excessive modem signal transition
s detected on line 22
-0ct 19 13:45:15.948: %HWIC_SERIAL-3-LINEFLAP: Excessive modem signal transition
s detected on line 19
-0ct 19 13:45:27.777: %TRACK-6-STATE: 1 ip sla 1 state Up -> Down
-0ct 19 13:45:33.617: %VRRP-6-STATECHANGE: Gi0/0 Grp 80 state Master -> Backup
-0ct 19 13:45:39.681: %TRACK-6-STATE: 1 ip sla 1 state Down -> Up
-0ct 19 13:45:45.373: %VRRP-6-STATECHANGE: Gi0/0 Grp 80 state Backup -> Master
-0ct 19 13:46:13.861: %HWIC_SERIAL-3-LINEFLAP: Excessive modem signal transition
s detected on line 22
-0ct 19 13:46:18.693: %HWIC_SERIAL-3-LINEFLAP: Excessive modem signal transition
s detected on line 19
-0ct 19 13:47:31.249: %HWIC_SERIAL-3-LINEFLAP: Excessive modem signal transition
s detected on line 19
-0ct 19 13:47:31.281: %HWIC_SERIAL-3-LINEFLAP: Excessive modem signal transition
s detected on line 22
```

With show lien command, we can see which port correspond to those lines:



```

SUMI-CISCO-USAT-1-B-U15#sh line
Tty Line Typ Tx/Rx R Modem Roty AccO AccI Uses Nois
0 0 0 0 0 0 0 0 0 0 0 0
0/0/0 1 AUX 9600/9600 - - - - - - 0
0/0/0 2 ITY 9600/9600 - - - - - - 0
0/0/1 3 ITY 2400/2400 - inout - - - - 0
0/1/0 4 ITY 2400/2400 - inout - - - - 0
0/1/0 19 ITY 2400/2400 - inout - - - - 0
0/1/1 20 ITY 2400/2400 - inout - - - - 0
0/1/2 21 ITY 2400/2400 - inout - - - - 0
0/1/3 22 ITY 2400/2400 - inout - - - - 0
0/1/4 23 ITY 2400/2400 - inout - - - - 0
0/1/5 24 ITY 2400/2400 - inout - - - - 0
388 388 UTI - - - - - - 0
389 389 UTI - - - - - - 0
390 390 UTI - - - - - - 0
391 391 UTI - - - - - - 0
    
```

Línea	Puerto	Destino
3	0/0/0	SPIM
4	0/0/1	SEGU
19	0/1/0	SBRF
20	01/1	SKFD
21	0/1/2	SMPM
22	0/1/3	SOCA
23	0/1/4	TTZP
24	0/1/5	SYGC

Cable toward SOCA was checked, but it does not seem to prevent the « port blinking » from happening. Switching to chain A was achieved, it will be observed in order to see if the issue is transferred to chain A.

After some checking, on chain A only line 22 seems to have issue (SOCA).

**Inactive LAN port**

In chain B, the Ethernet port 0/1 was found not connected, from the cisco point of view and Switch point of view (port 14). In chain A, it is inactive but this is normal. Chain A will be tested and cable checked.

Switching to chain A was achieved in order to test this cable, and after a cable check the port rose. It should be under observation.



#### 4. NMS in Venezuela and Ecuador

##### Issues

In SVM1, a server reboot was issued and after that the NMS was not working. In the global NMS, SVM1 is green, which is different from the past situation.

In Ecuador, the server had a permanent led on:

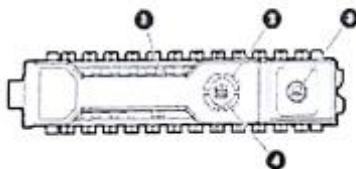


After reboot of the server, the NMS was not working anymore.

##### Resolution

First was checked the meaning of the different LED:

##### Hot-plug drive LED definitions

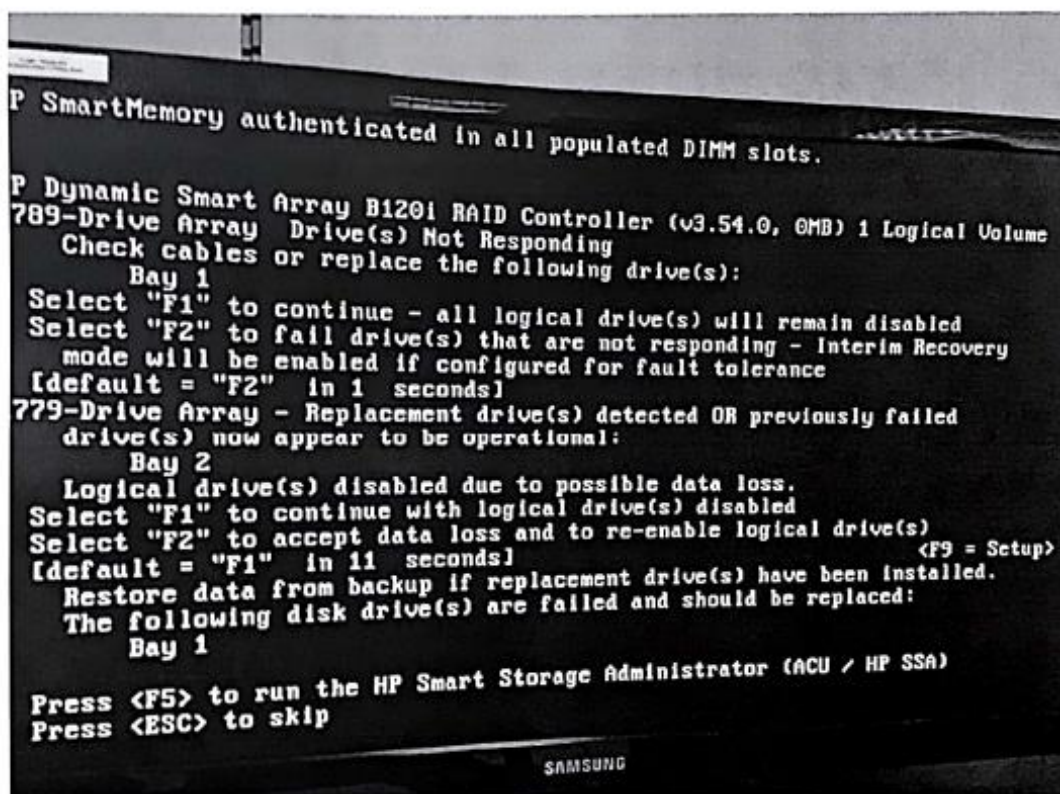


Item	LED	Status	Definition
1	Locate	Solid blue	The drive is being identified by a host application.
		Flashing blue	The drive carrier firmware is being updated or requires an update.
2	Activity ring	Rotating green Off	Drive activity No drive activity.
3	Do not remove	Solid white	Do not remove the drive. Removing the drive causes one or more of the logical drives to fail.
		Off	Removing the drive does not cause a logical drive to fail.
4	Drive status	Solid green	The drive is a member of one or more logical drives.
		Flashing green	The drive is rebuilding or performing a RAID migration, strip size migration, capacity expansion, or logical drive extension, or is erasing.
		Flashing amber/green	The drive is a member of one or more logical drives and predicts the drive will fail.
		Flashing amber	The drive is not configured and predicts the drive will fail.
		Solid amber	The drive has failed.
		Off	The drive is not configured by a RAID controller.



The process of rebuilding was reviewed along with the local operators.

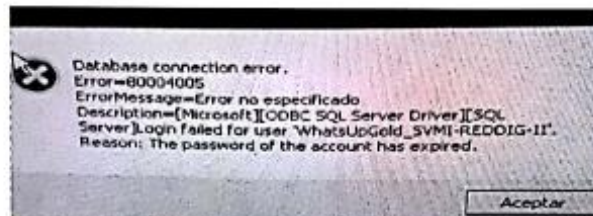
When one single disk is present, it appeared that the following message with the disks appears: (example of Ecuador)



After several tests, "F2" shall be pressed twice in order to proceed anyway to recovery.

Even if one single disk is present, it shall be placed at the place it was before being removed (i.e. disk 1 in space 1, disk 2 in space 2).

The NMS had the same BDD issue than Venezuela earlier:



The NMS rose with the back-up disk, Disk 3, placed in space 2.

Then, during normal operation disk 1 was inserted on space 1 for reconstruction (hot plugged). Then, after around 30 min, the disk1 was fully operational.

After a normal restart, the NMS services were operational.

So, after a last power off, disk 3 was removed from space 2, and NMS was started only on disk 1. After normal operation checking (and accepting the different boot options at start-up), disk 2 was inserted in space 2 during regular operation (hot plugged) for reconstruction and remained at that state.

In Venezuela, same process was achieved, using disk 3 for NMS recovery.



## 5. Coaxial cable check at Brasilia

### Cable check

The drawings were checked and possible inversion is observed at 10 Mhz injector, between Rx in and Out. The cables heading to the antenna were not labelled, so they were labelled.

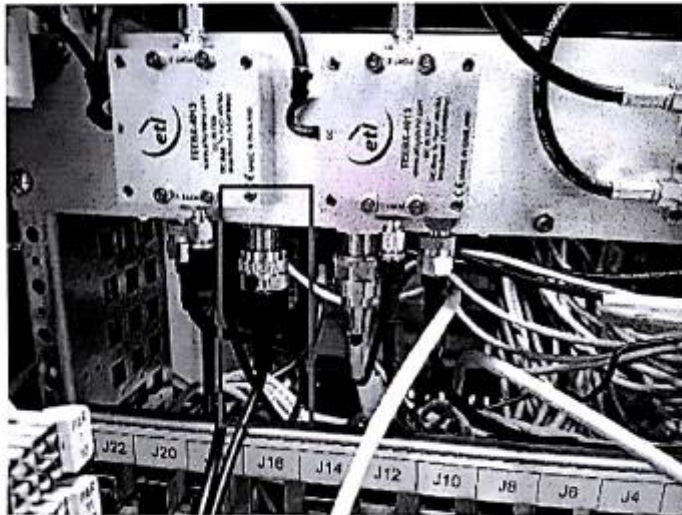
The procedure to be implemented was the following:

1. Transfer the services on ground backbone
2. Switch off power transmission at IBUC level
3. Put modem A in test mode with CW clean carrier
4. Put modem B in passive mode
5. Modify IBUC configuration to have continuous lecture of the power
6. Check the power at IBUC level
7. Test the power with 10 MHz ref.
8. Normalize modem and IBUC situation except Power.
9. Disconnect LAN cables from both Skywan and connect through PPP (avoiding OSPF to rise)
10. Transmit power and check signal strength

It could be observed at that point that the IBUC were externally referenced but with a high decrease in term of power (10-9 dB EsNo compared to 12-13dB without external reference).

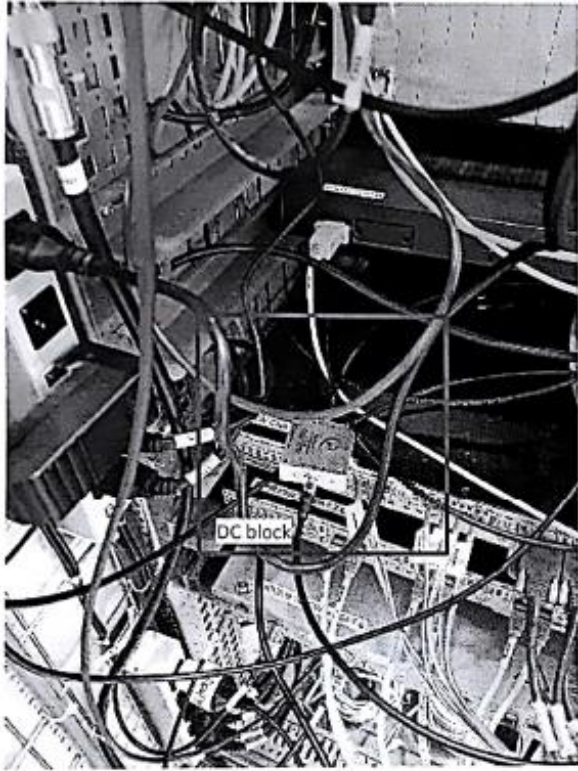
Several tests were made, including changing the 10 Mhz Bias T, but it did not solve the issue. The devices appeared to be DC powered not only via the 10 Mhz in signals, but through the Rx in cable. A DC block was found to solve this but it blocks the 10 Mhz too. Another one was built, and the result was successful.

While re-establishing the cabling, the cable are quite solicited in terms of radius of curvature, and it seems to degrade the signal. The cabling was thus modified to avoid such issue.

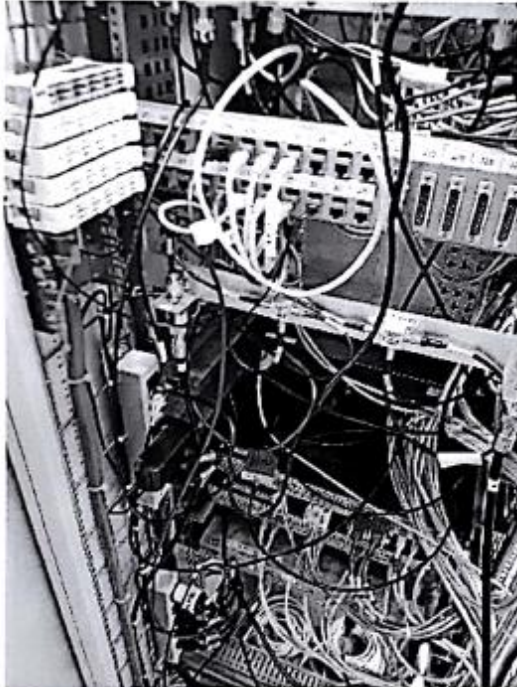




A handwritten signature in black ink, followed by the initials "CC" written below it.



A handwritten signature and the initials "CC" are located in the bottom right corner of the page.



Now, the DC bloc is temporary, a permanent one shall be sent as DC power at Tx cable cannot be switched of.

2 DC blocks will be sent, to be installed directly at the Tx output of each modem. This should be arranging the issue. if not, apply the following procedure, summed-up is the following (a video was filmed by Javier on that matter):






- Retrieve the temporary mounting
- Put the DC bloc on the 10 Mhz bias T
- Plug the original cable to the DC block
- Check normal operation (EsNo) and that IBUC are externally referenced.

After several test, it could be observed that a 3dB loss in Tx for transmission was observed, possibly due to the different reset achieved. The attenuators were changed on both modem A and B, so did we on IBUC attenuators.

These changes must be introduced in SkyNMS Network configurator to avoid any discrepancy.



Power control at Tx output

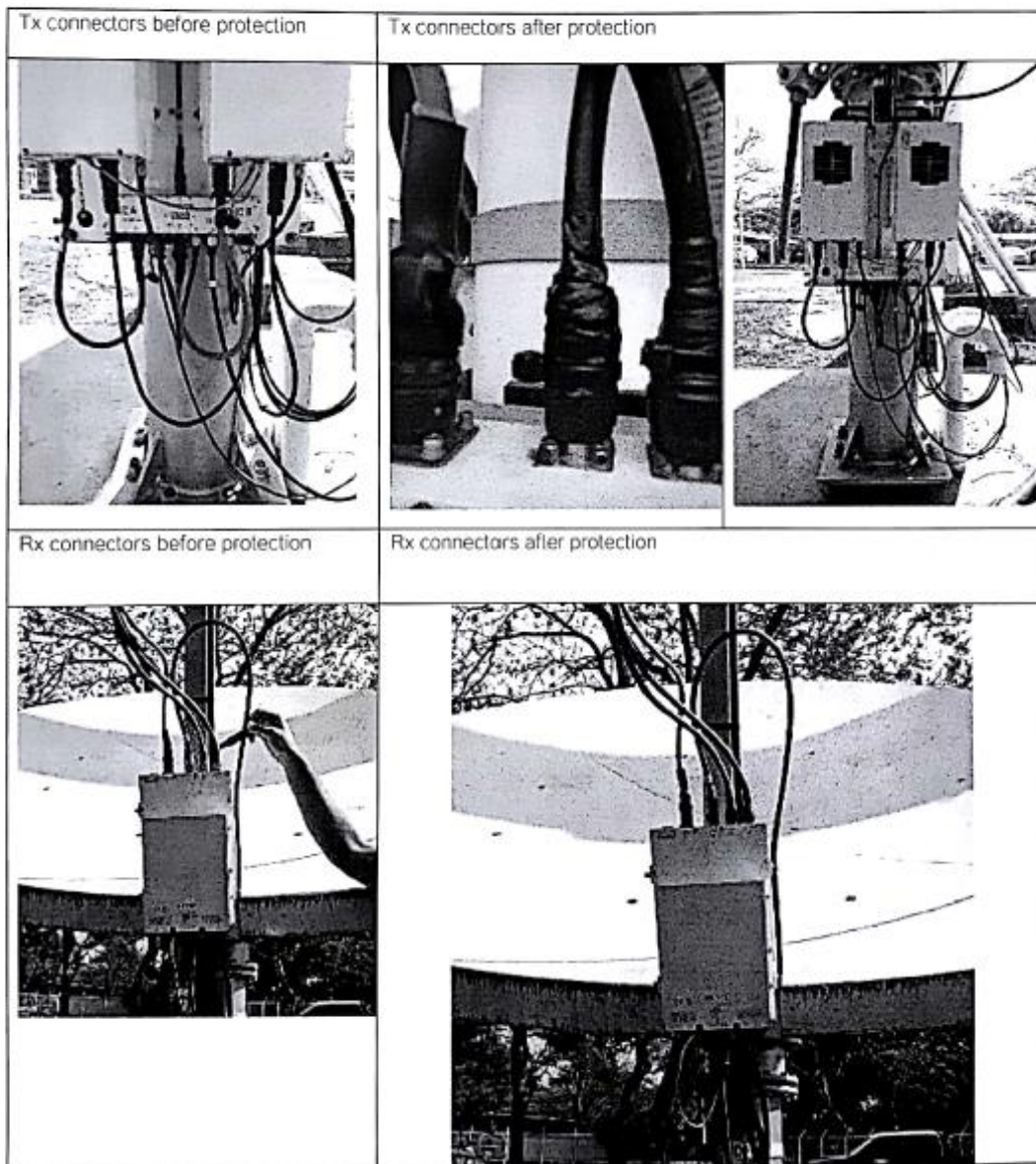
Modem A	Modem B
	
	
	

*Handwritten signature*  
CC



External connectors protection

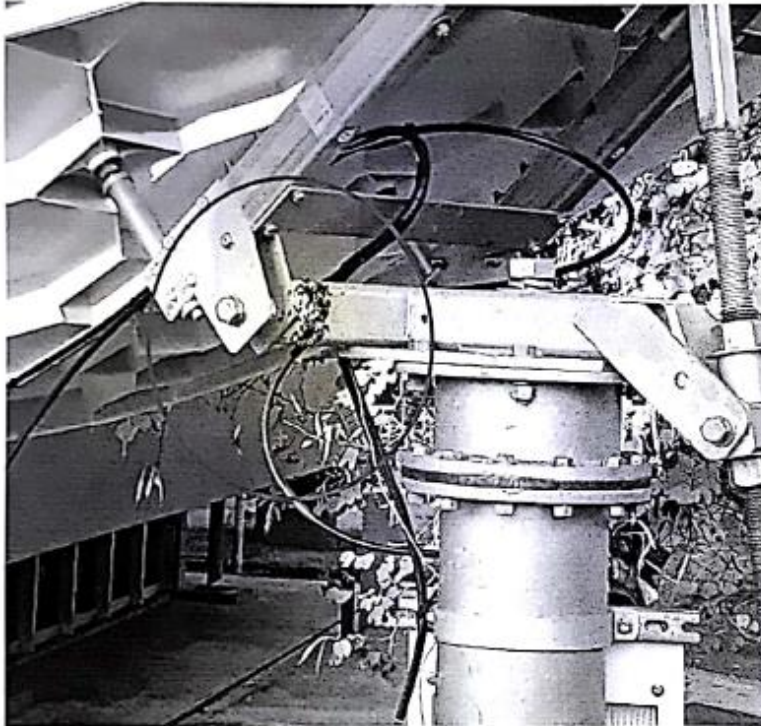
External connectors were not protected with tape. This was corrected:



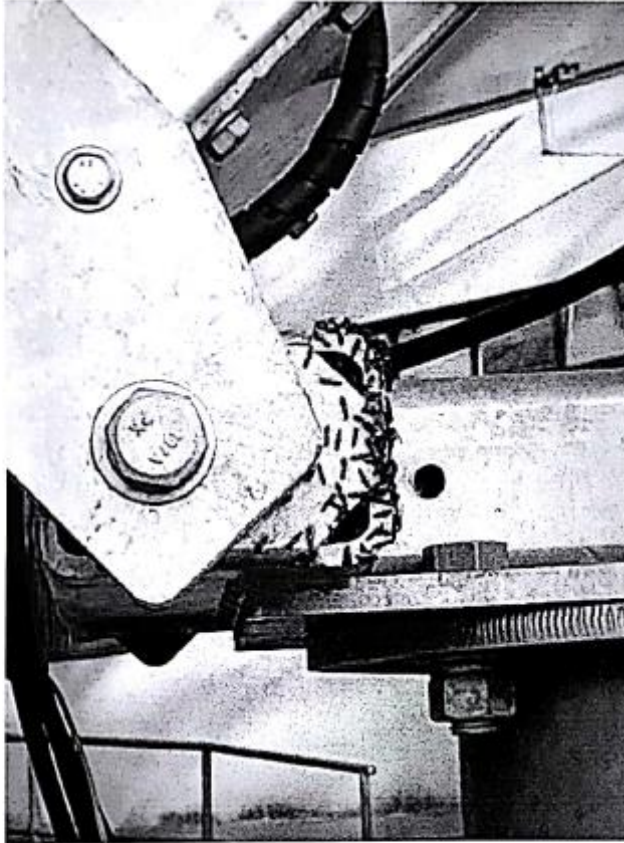


Bee nest cleaning

A bee or fly nest was found inside antenna structure:



A handwritten signature in black ink, consisting of a stylized, cursive script.



The nest was cleaned by firemen and Sgt Maia, using CO2 extingtor instead of fire. May the flies rest in peace.

A handwritten signature in black ink, consisting of a stylized, cursive-like name followed by the letters "CC".



A handwritten signature or mark, possibly initials, consisting of a vertical line with a horizontal stroke and a small loop at the bottom.



## 6. Loss of packets at Skywan A modem

### First observation

The Skywan modem A losses many packet once plugged on switch A. here is a description of what could be observed:

- When we plug skywan A on switch A, it begins to have many packet loss when issuing a ping. Connecting using telnet becomes difficult
- When we connect to switch B, after having this trouble, the issue continues.
- Then, when we directly connect a computer to the modem, the issue continues.
- Now, when connected directly, after a modem reboot, there is no problem.
- If we now connect to switch B, no issue.

First conclusion: in switch A, something is disturbing the modem, and this disturbance remains after disconnection for an undetermined time.

Configuration was checked having no identified disturbance.

### Switch exchange and tests

The new configured switch was installed, and the Skywan was first plugged, without other service. Then, one by one the services were plugged in, and the loss of packet controlled by ping.

At the end, last cable plugged was port 24, which is the trunk heading to switch B. There, the issue rose. Thus, there is a bad traffic sent over this trunk, affecting the skywan on switch A.

Suspected 802.1q traffic disturbing the Skywan.

### Update and resolution

The different tests achieved on Octobre 19<sup>th</sup> resulted unsuccessful, even in access mode, traffic could not flow from one switch to another properly. Only VRRP could.

After many tests conducted, Javier took the salutary initiative to ask Netgear support before I get crazy and destroy everything, initiative he has duly took earlier this year.

After a couple of hours with the support agent (Angel O.), who could enter the system using Teamviewer, he finally advised to first update the firmware prior further inspection. It was difficult for him to understand quickly the current configuration, which is understandable.

Thus new firmware was downloaded, v 10.0.2.26, and the switches were updated:

- First the earlier removed .51
- Then was removed .52 (system running with .53) and updated
- Switched .52 was introduced to the system
- .53 removed and replaced by .51

The ping was far better, in chain B and chain A, latency is between 1ms and 10ms (which seems a bit high, but not affecting the system).



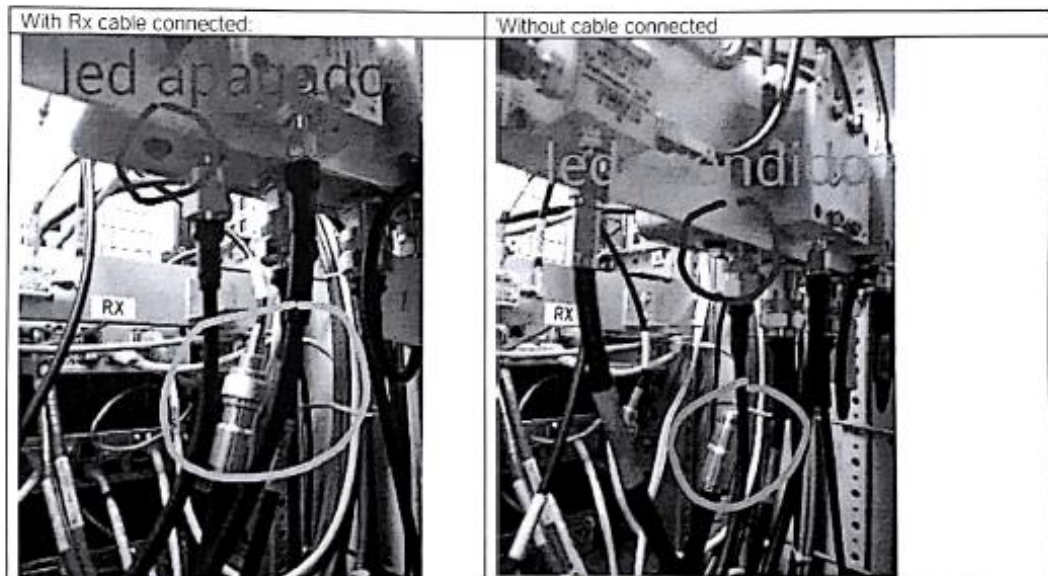
7. Issue in SAEZ

During the night of the 18 to 19<sup>th</sup> of October, the network experienced a complete satellite outage. This was due to an issue at Rx level at Ezeiza's. Both Skywan lost reception, so that the master modem at Ezeiza tried to be master and thus transmitted on the same frequency, at the same time that other stations, creating an interference.

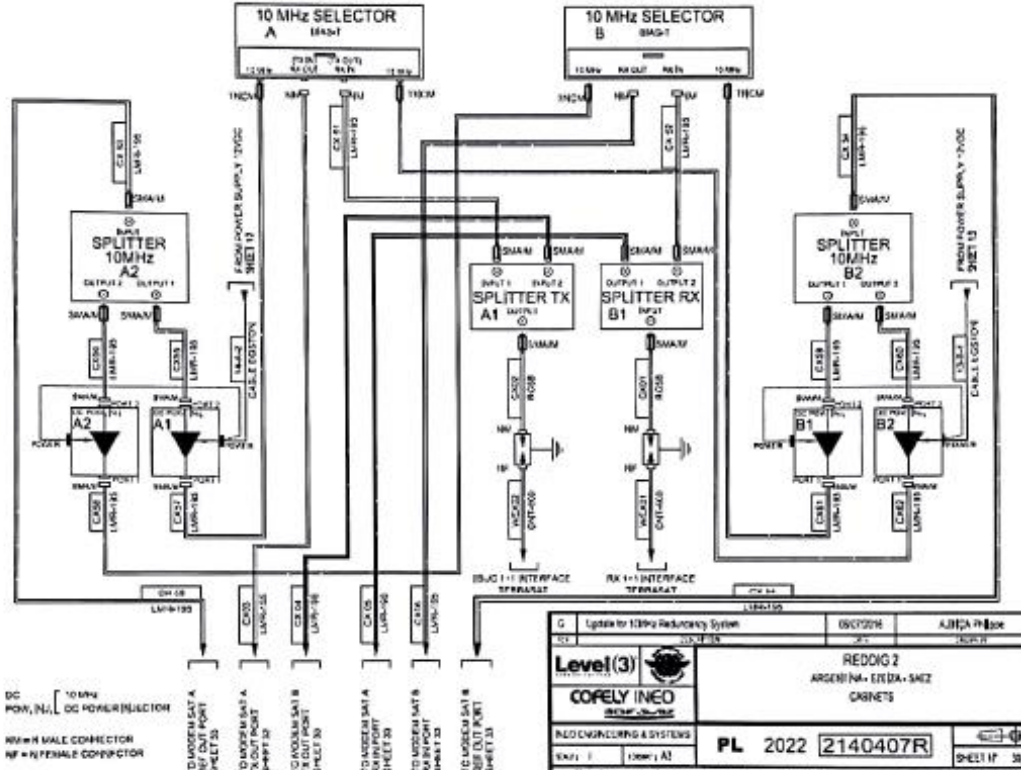
Modem were switched off, but as manaus received master bursts, it stopped momentarily to transmit. The staff reacted resetting it, restoring the operation of the service except satellite at Ezeiza's, staying on GBB.

On October 20<sup>th</sup> different tests were made in coordination with Ezeiza staff, in order to find the source of the issue. A big storm was raging during that night, which might be the root cause of the issue.

Investigation shows that on nominal cabling, the 10 MHz bias T for reception as its two led off (DC presence and 10 MHz presence). But as it was asked to check the cables, it appears that once the "Rx in" port is disconnected from the cable leading to the antenna (through a surge arrester) the LEDs are back in green. Surge arrester was by-passed but with no result.



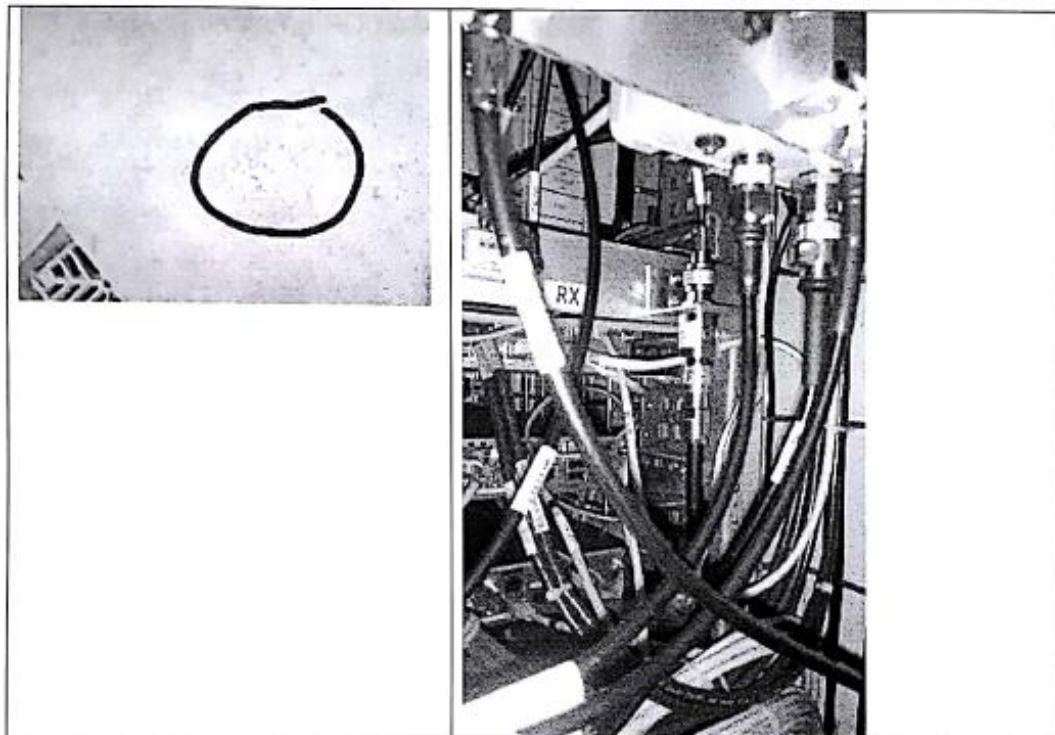
*f*  
CC



Cables were crossed between tx and Rx (WEX 01 and 02) and the issue was transferred to the transmission Bias T. Thus something coming from the Rx cable is disturbing the Bias T. Maybe a DC power or AC.

Thus, cable were checked, showing a short-cut. Connectors were checked, and the end connector was found with inner cable protector touching the connector, creating the short-cut. It was cleaned and nominal situation recovered:

Cable protector	Normalized situation
-----------------	----------------------



f  
CC



8. Gorgy timing and HDD backup in SBRR

Gorgy timing

NT server was found with internal Sync. Connecting to the device (10.100.34.80, RCTP09\_User / gtm09). It was set according to the following example (extract from the instruction manual):



And then GPS is in sync:



Then "maintenance" message was removed as per the recommended procedure:

- Push the button marked with the right arrow and hold it on.
- While holding on the above button, push quickly 10 times minimum the button marked with the left arrow.

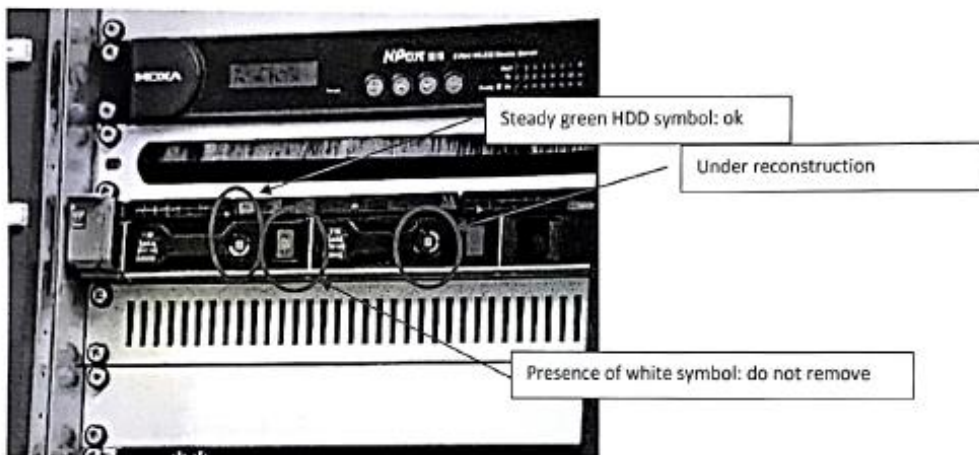
The "MAINTENANCE" message should then disappear.



HDD backup

HDD was backed-up following the procedure. The difference here is that the bios is more recent and you do not have to press "F2" or do anything for RAID recovery.

Procedure was followed successfully but at the end the two disks were inserted simultaneously which was not appropriate. Then one out of two was introduced (number 1) and then after start-up the second one was inserted for reconstruction.



The new HDD was stored, and the two pre-existing HDD were inserted. This was not completely appropriate. HDD 1 should have been inserted first, alone, and the server started. After normal startup then the second HDD should have been inserted to avoid BDD mismatch.

This was experienced in that case and the above mentioned procedure (first HDD1 then HDD 2) was applied successfully. The server was then restarted to check nominal operation.



### 9. Support to ND Satcom

First was checked the Serial port connection to Manaus modem A, without disturbing the network connection.

M. Utz from ND Satcom had to enter the network in order to place a debug software in Manaus Modem A. Support had to be given to him, as he experienced troubles in accessing Manaus local server, as per the different hops to be achieved to reach this server (PPTP connection to Brasilia, remote desktop to Brasilia NMS and from there remote desktop to Manaus).

Then, some software were required by him to achieve its tasks, so that with the help of NCC staff, putty and 7zip were placed on Manaus local server.

Hyperterminal, as per ND Satcom, does not completely transcript or mis-transcript some characters, so that Putty was set.

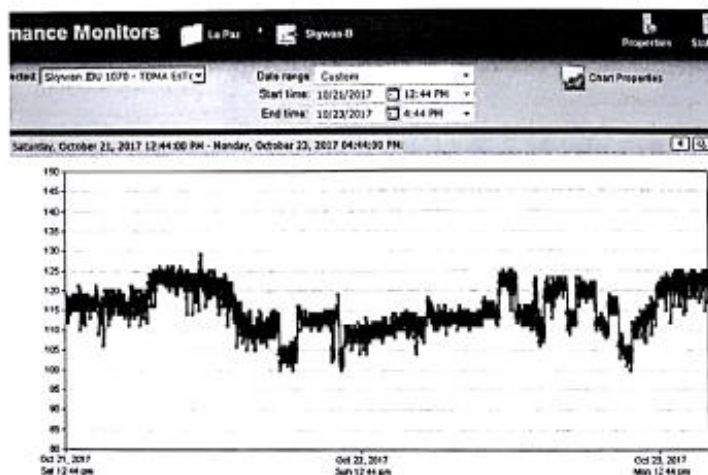
7zip was required because the file sent by ND Satcom was compressed in GZ format, and had to be unpacked first.

Now, ND Satcom has a PPTP connection and the know-how to reach the modem. They were informed to advise REDDIG administrator prior to enter the network so that everybody (i.e. REDDIG NCC and Brasilia staff) that they are using the different servers.

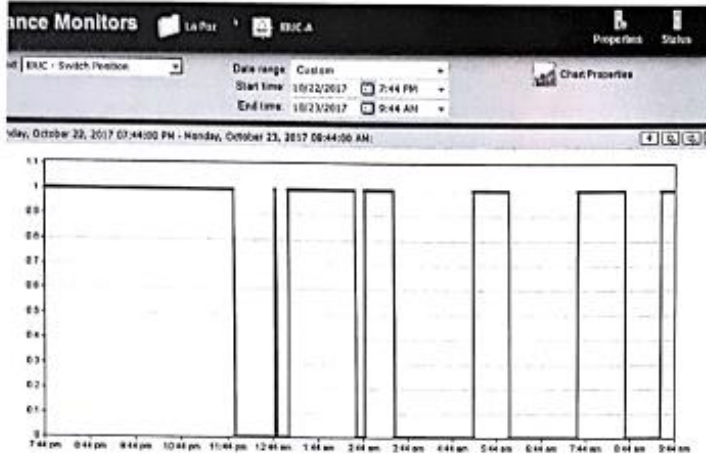
### 10. La Paz checks

La Paz has instability issues and synchronization losses, mostly during the night. Those later days, this did not appear, but still we could see that the IBUC has many switchovers due to "output power low":

EsN00wn:



Con respeto a los IBUC:



Parameters were changed in the IBUC to prevent this warning (output low) from happening and causing this switchover:

FM Cfg	Interface Cfg	System Cfg	Alarm Cfg	Redund Cfg	Alarm Log
<b>IBUC A - ONLINE - TE5022375</b> SLLP La Paz Save Settings			<b>IBUC B - STANDBY - TE5022375</b> SLLP La Paz IBUC B Save Settings		
Tx Output: <input type="checkbox"/> Enable Power Monitor Frequency: 6015 MHz Tx State at Powerup: <input type="checkbox"/> Enable Tx Powerup Delay: 1 Sec Power Read Mode: <input type="checkbox"/> Burst			Tx Output: <input type="checkbox"/> Enable Power Monitor Frequency: 6015 MHz Tx State at Powerup: <input type="checkbox"/> Enable Tx Powerup Delay: 1 Sec Power Read Mode: <input type="checkbox"/> Burst		
<b>Burst Threshold: 27.0 dBm</b> Burst Timeout: 2 Sec Gain Mode: <input type="checkbox"/> Open Attenuation: 12.0 dB Tx Input Threshold Low: -60.0 dBm Tx Input Threshold High: -15.0 dBm <b>Tx Output Threshold Low: 26.0 dBm</b> Tx Output Threshold High: 47.0 dBm Current Gain Control: 0.8 dB Gain Control Reset: <input type="checkbox"/> Select Internal 10MHz Trim: 139			Burst Threshold: 27.0 dBm Burst Timeout: 2 Sec Gain Mode: <input type="checkbox"/> Open Attenuation: 12.0 dB Tx Input Threshold Low: -60.0 dBm Tx Input Threshold High: -15.0 dBm Tx Output Threshold Low: 26.0 dBm Tx Output Threshold High: 47.0 dBm Current Gain Control: 0.8 dB Gain Control Reset: <input type="checkbox"/> Select Internal 10MHz Trim: 139		
<small>Wed Oct 24 2017 11:45:42 GMT-0500 (Guape Universal Coordinated)</small>			<small>This page generated: Tue Oct 24 2017 11:45:49 GMT-0500 (Guape Universal)</small>		

So far, 5 hours later, no issue was reported. Final check will be issued tomorrow.

f  
cc

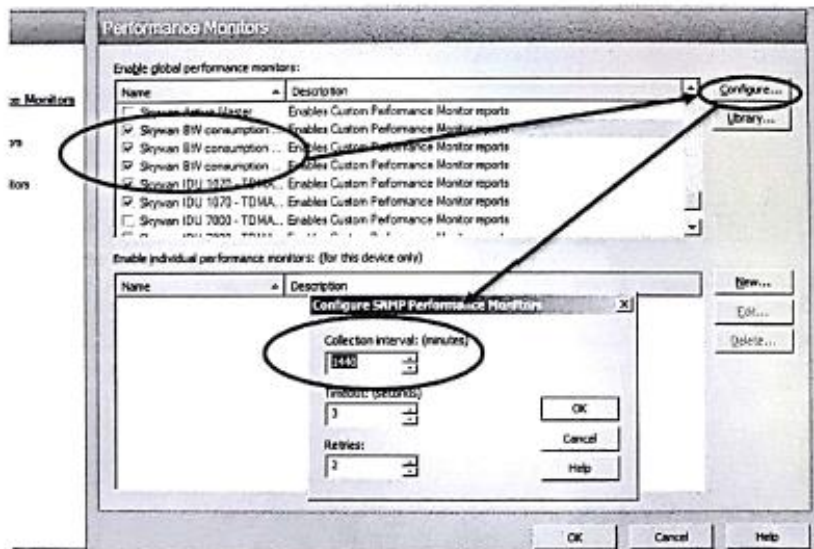
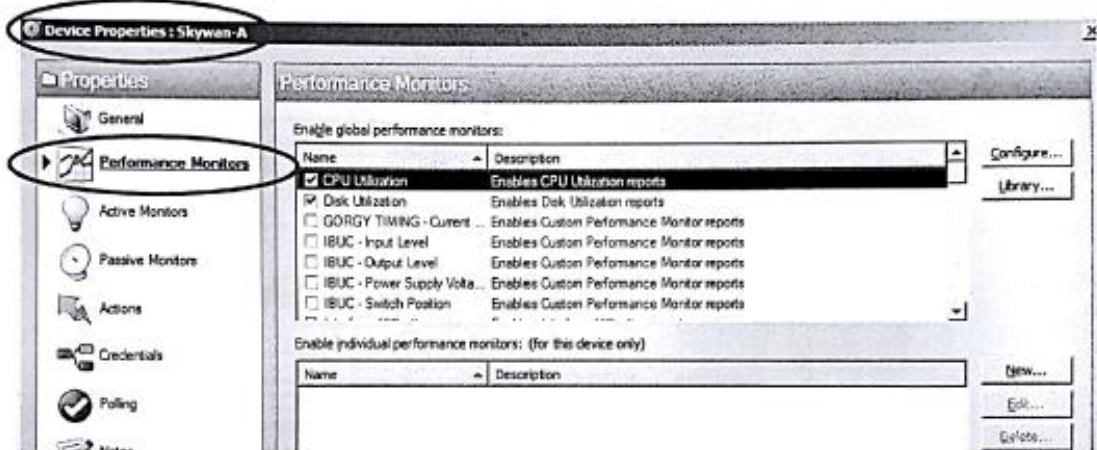


### 11. Bandwidth consumption calculation

Bandwidth consumption calculation as far as known has to be achieved individually, per modem and per carrier. The values polled are the Satmux Tx Payload Bytes Sent, for each carrier.

Currently, the values polled are Delta values (difference between one day and another), which is not optimum for a fast bandwidth estimation.

The values are polled each day (1440 min polling, configured for each modem performance monitor for bandwidth), which mean one single value per day:



CC



This is accurate for monthly reporting.

An advised modification would be to switch from a Delta polling to an absolute polling, changing the plot to "raw data":

The screenshot shows a network management interface. At the top, a table lists devices:

Device Name	Host Name	Address	Device Type	Status
Skywan-A	10.100.34.31	10.100.34.31	Skywan EDU 10...	
Skywan-B	10.100.34.32	10.100.34.32	Skywan EDU 10...	

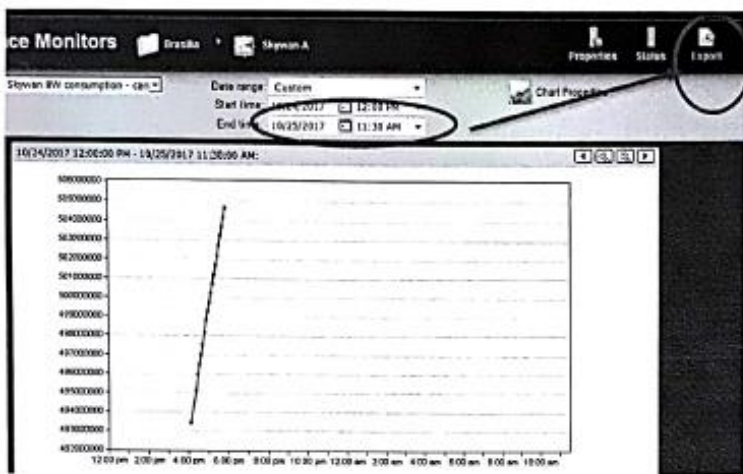
Below the table is a 'Performance Monitor Library' dialog box with a list of items. One item is selected:

Name	Description
Skywan BW consumption - carrier 1	Enables Custom Performance Monitor reports

The 'Edit SNMP Performance Counter' dialog box is open, showing the following fields:

- Name: Skywan BW consumption - carrier 1
- Description: Enables Custom Performance Monitor reports
- Performance counter: 1.3.6.1.4.1.247.98.5.1.1.1.4
- Instance: 1
- Plot raw values

To achieve an export, on the web browser, select the correct period and export:



Then select excel and save the file :



On the following file we can see the current configuration, with a polling each day, and delta values:





G285			
A	B	C	
<b>1 Custom Performance Monitor</b>			
<b>2 Device: Skywan-A - Custom Monitor: Skywan BW consumption - carrier 1 - 01/01/2017 04:00:00 PM - 10/24/2017 04:40:00 PM</b>			
3 Poll Time	Value	Time Delta	
4 01/02/2017 00:00	283810.9489	86474.71191	
5 01/03/2017 00:00	319841.8764	86473.10486	
6 01/04/2017 00:00	293789.0098	86479.29773	
7 01/05/2017 00:00	185866.1959	85932.28278	
8 01/06/2017 00:00	848231.5922	86547.70392	
9 01/07/2017 00:00	204811.7292	86587.84369	
10 01/08/2017 00:00	153728.869	86564.77008	
11 01/09/2017 00:00	412272.845	86007.41559	
12 01/10/2017 00:00	386012.01	86557.4469	
13 01/11/2017 00:00	256538.165	86525.55762	
14 01/12/2017 00:00	863355.7402	45088.28527	
15 01/18/2017 12:00:00 AM	1135763903	557552.532	
16 01/19/2017 12:00:00 AM	273766.4256	86587.49109	
17 01/20/2017 12:00:00 AM	168498.1188	86586.22705	
18 01/21/2017 12:00:00 AM	530218.8891	85958.16364	
19 01/22/2017 12:00:00 AM	162480.7067	86559.86322	
20 01/23/2017 12:00:00 AM	57244851.35	86583.76129	
21 01/24/2017 12:00:00 AM	792928.8251	86549.7498	

CHEVALLIER Clément  
 Technical project manager, ENGIE INEO



12. Achievement sheet

For ICAO	For INEO
Ing. Christian Javier VITTOR	Ing. Clement CHEVALLIER
	

### Replacement of the DC Block in the Brasilia node

The DC Block needed to be replaced by four definitive DC-Blocks adapted to the frequency range of the REDDIG system. For which INEO sent to the SBBR site four DC Block BLK-6-N + (Mini-Circuits). These were finally installed on January 10, 2018, leaving the Brasilia station with all the problems resolved.

This task was scheduled and planned, on the aforementioned date, and the installation of the DC Blocks in the Brasilia node was proceeded in due time, in coordination with Eng. Clement, Ten. Rodolfo, Sg. Maia, and this Administration.

It should be noted that the services were not affected. Before starting the replacement, the IBUCs were disabled and started working for the terrestrial backup.

Once the task was finished, the status of the IBUCs was normalized and enabled, with which the station returns to normal operation and with the new DC Blocks.



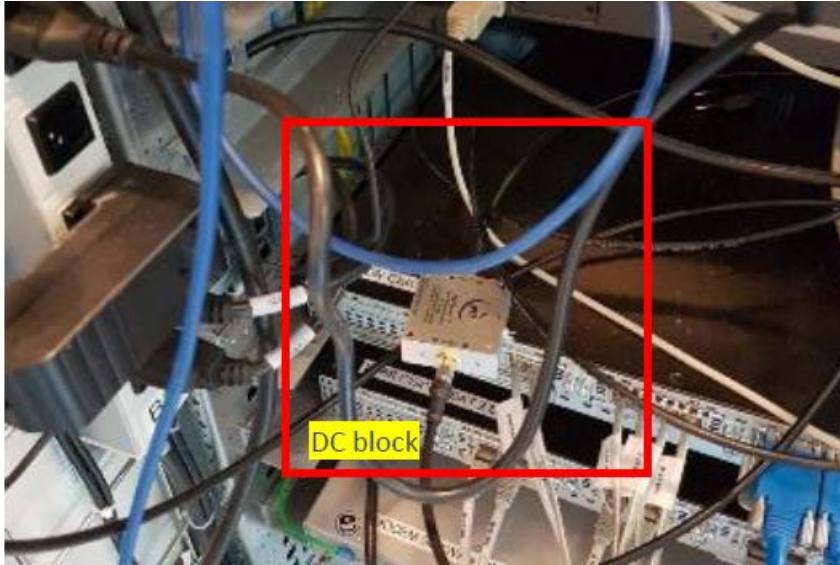
*Esta imagen muestra dos DC Blocks en Skywan A*



*Esta imagen muestra dos DC Blocks en Skywan B*



*Esta imagen muestra que el DC Block anterior fue retirado*



*DC Block que se había instalado provisoriamente (no existe actualmente)*

*Informe sobre baja performance  
Estado de situación de los Servicios Brindados por Level 3  
En los nodos de Manaus (Brasil) y Maiquetía (Venezuela)*



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## 1. INTRODUCCIÓN

### 1.1. OBJETIVO

Este documento presenta un informe de baja performance de los servicios de backup terrestre de la REDDIG brindados por Level 3, en particular en los nodos Manaos (NCC de la REDDIG) y Maiquetía. Se demostrará que el servicio de Level 3, brindado en los nodos mencionados, presenta problemas muy serios, y que la empresa debe dar una pronta solución o las pertinentes acciones previstas en tal sentido.

### 1.2. ALCANCE

Servicios C.N.S. de la Región SAM, Oficina CNS SAM, Administración y Gestión de la REDDIG, Estados de la Región SAM y Seguridad Operacional.

### 1.3. REFERENCIAS

Información obtenida del WUG de la REDDIG, de la Administración y Gestión de la REDDIG, y portal de Level 3.

### 1.4. DEFINICIONES

Level 3	Proveedor de la red terrestre backup de la REDDIG con presencia en todos los nodos
MPLS	Multiprotocol Label Switching: mecanismo de transporte de datos estándar creado por la IETF y definido en el RFC 3031
NCC	Network Control Center
Nodos REDDIG	Centros neurálgicos de telecomunicaciones aeronáuticas
OACI	Organización de Aviación Civil Internacional
REDDIG	Red Digital Sudamericana. Carrier principal de telec. Aeronáuticas de SAM
SAM	Designación que OACI le asigna a la Región Sudamérica
WUG	Whats Up Gold

### 1.5. NOTACIÓN

La presencia de una barra vertical sobre el margen izquierdo de un párrafo, como en este caso, indica que el mismo tiene modificaciones con respecto a la revisión anterior del documento.



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## 2. SITUACIÓN ACTUAL

Para poder abordar la **problemática de los nodos Manaos y Maiquetía**, debemos plantear el escenario en el cual nos encontramos y de esa manera lograr dimensionar la criticidad de la falta de soluciones definitivas a lo que está aconteciendo.

Actualmente la REDDIG cuenta con una red MPLS de Backup contratada a la empresa Level 3. Provee un acceso 256kbps por cada uno de los 17 nodos que conforman la REDDIG. En tal sentido, se debe destacar que los nodos principales o de gestión de la red se encuentran en **Manaos** y Ezeiza.

Esta red MPLS constituye una red de contingencia esencial ante inconvenientes que perjudiquen el normal funcionamiento de la red satelital, principal red utilizada para los servicios de tránsito aéreo de la Región Sudamericana.

Desde sus inicios, Level 3 debe brindar, para cada caso, una alta disponibilidad, la cual es monitoreada por la administración de la REDDIG.

En tal sentido, Level 3 brinda un portal, el cual permite, entre otras cuestiones, generar un reclamo por novedades en el servicio a través de un sistema de tickets.

De los accesos y uso del portal se detectaron muchas discrepancias que presentan al mismo como una herramienta que debe ser mejorada y que es poco fiable.

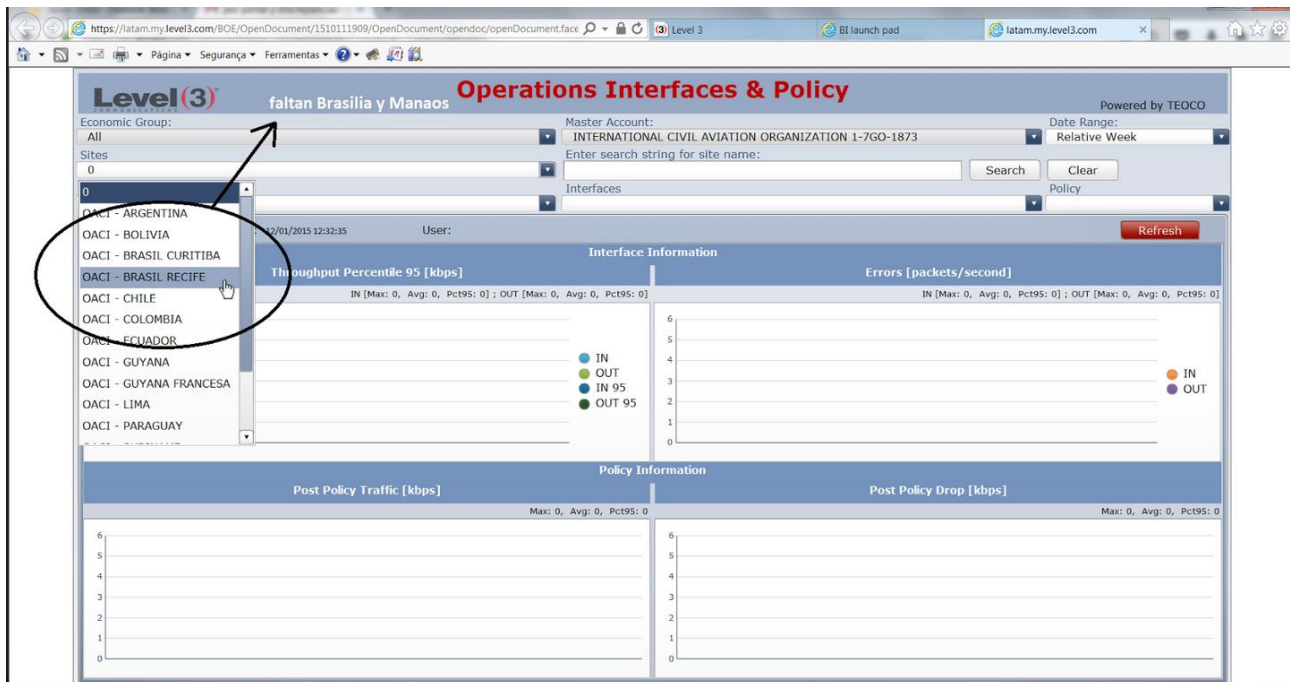
En relación a la prestación del servicio, debemos destacar lo tratado oportunamente, en una reunión con el Sr. Quiñones el día 08 de julio de 2017 en la Oficina Regional de la OACI en Lima (ver Anexo Bravo). Entre los temas tratados, se destacan los casos de **Maiquetía y Manaos**, que **presentan innumerables y reiterativas novedades**.

Recordar que, además de ser una red que soporta servicios esenciales para la seguridad operacional del tránsito aéreo de la Aviación Civil (crítico), **el caso de Manaos se destaca por ser el NCC principal de Sudamérica**.

De la experiencia y situaciones que se suscitan a diario, se pueden obtener una serie de conclusiones:

- 1) Las novedades en Manaos y Maiquetía son muy reiterativas.
- 2) Si se toma la información del portal para calcular la indisponibilidad, Level 3 debe corregir algunas cuestiones, porque no se están registrando los eventos como corresponde. Además, si es la manera de obtener la indisponibilidad, no es un método aceptable por las discrepancias observadas.
- 2) Si el portal basa, en general, la presentación de la información en función de los tickets, la información presentada no es precisa.
- 3) Si no se corrigen algunas cuestiones del portal, el mismo no es funcional, ya que la información no es fiable. Sólo se puede emplear para verificar los tickets y administrar usuarios.

4) Para citar un ejemplo, observamos que en algunas opciones que presenta el portal, no aparecen todos los nodos, entre otras cuestiones.



## 2.1 Uso del portal para calcular indisponibilidad.

En tal sentido, ante la consulta sobre el uso del portal para calcular la indisponibilidad, el Sr. Jorge ChuKoo, ServiceClient Manager, Product& marketing de Level 3 Communications, nos brindó la respuesta:

- *La disponibilidad de los informes son basados en los tickets generados, no son directamente tomados del portal, adicional se hacen revisiones de los tickets involucrados en los tiempos de disponibilidad.*

Existen muchas discrepancias para entender los motivos por los cuales las indisponibilidades de Level 3 no concuerdan con las presentadas por esta Administración, si se toma como parámetro lo que muestra el portal.

Por parte de la Administración de la REDDIG, la indisponibilidad se obtiene con la herramienta WhatsUp Gold (muestreo cada minuto). El procedimiento es aceptado por Level 3 desde 2016.

## 3. INDISPONIBILIDAD DE MANAOS Y MAIQUETÍA

A continuación se muestra una Tabla anual de indisponibilidad de Manaos y Maiquetía, en donde se observa un resumen mensual del presente año, hasta el mes de agosto, en función de la indisponibilidad de Level 3. En la misma se observan (en función de la ET vigente):

- 1) BW: ancho de banda,
- 2) Availa-bilityLevel 3: disponibilidad ofrecida por Level3,
- 3) y MRC: costo por servicio por nodo.





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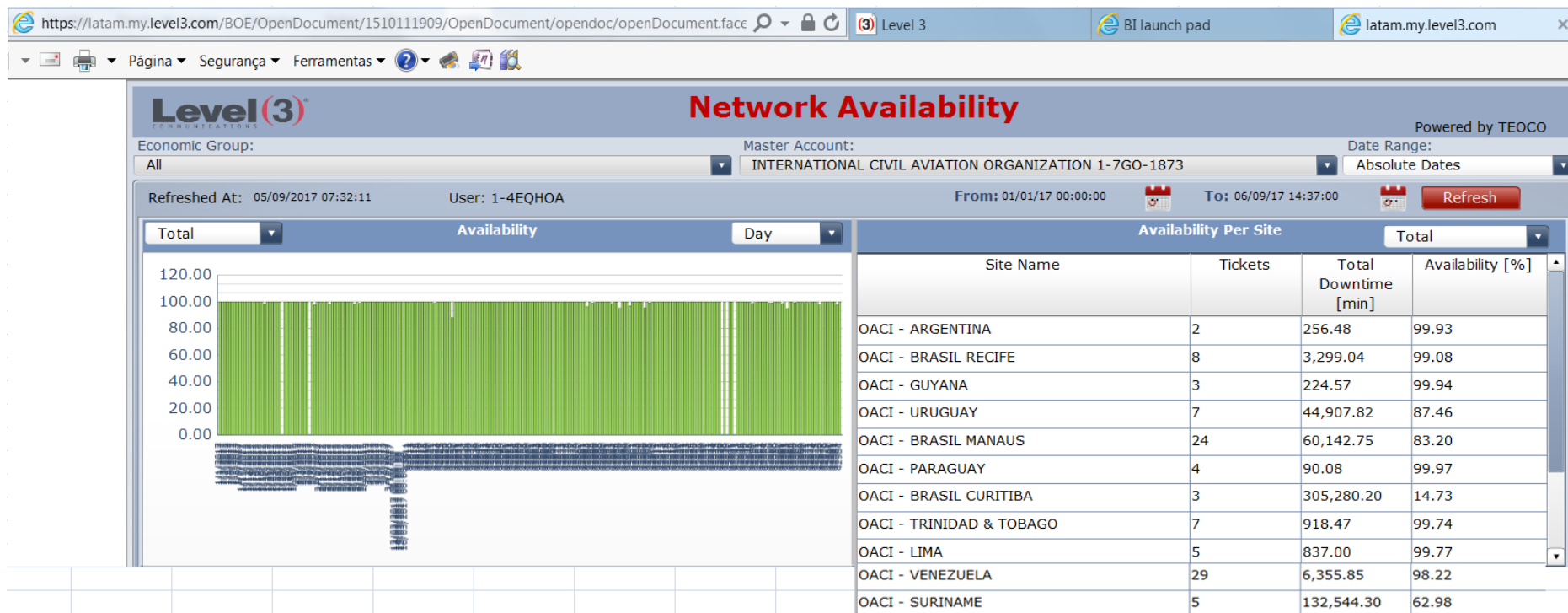
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La siguiente captura del portal de Level 3 muestra incoherencias notables en la columna de Availability. Este es otro ejemplo concreto de la falta de fiabilidad de la información mostrada por esta herramienta brindada por Level 3.



#### 4. HISTORIAL TICKETS DE LOS NODOS MAIQUETÍA Y MANAOS

A continuación se muestra el historial de tickets de los nodos Maiquetía y Manaos.

Se observan casos en los cuales se han tardado hasta semanas en resolver el mismo en función de las fechas de apertura y cierre del ticket.

Historial Tickets					
Maiquetía			Manaos		
Nro Ticket	Fecha		Nro Ticket	Fecha	
	Abierto	Cerrado		Abierto	Cerrado
#12094186	19/01/2017	19/01/2017	#12214455 (*)	09/02/2017	
#12293086	26/02/2017	03/03/2017	#12217615 (*)	12/02/2017	
#12467781	28/03/2017	31/03/2017	#12291188 (*)	24/02/2017	
#12505752	04/04/2017	26/05/2017	#12300633 (*)	27/02/2017	
#12506302	04/04/2017	26/05/2017	#12549685 (*)	12/04/2017	20/04/2017
#12506304	04/04/2017	26/05/2017	#12751018 (*)	22/05/2017	22/05/2017
#12642325	30/04/2017	04/05/2017	#12874342 (*)	13/06/2017	
#12721497	16/05/2017	19/05/2017	#13052902 (*)	15/07/2017	
#12800098	30/05/2017	05/06/2017	#13110356	26/07/2017	27/07/2017
#12844115	06/06/2017	13/06/2017	#13134966	01/08/2017	01/08/2017
#12865441	09/06/2017	20/06/2017	#13139655	01/08/2017	03/08/2017
#12886349	14/06/2017	16/06/2017	#13185955	10/08/2017	11/08/2017
#12925455	20/06/2017	23/06/2017	#13207630	15/08/2017	15/08/2017
#12968625	28/06/2017	04/07/2017	#13248135	22/08/2017	04/09/2017
#13009933	07/07/2017	11/07/2017	#13248157	22/08/2017	23/08/2017
#13059905	17/07/2017	17/07/2017	#13270659	26/08/2017	27/08/2017
#13151294	03/08/2017	12/08/2017	#13273057	27/08/2017	28/08/2017
#13151535	03/08/2017	11/08/2017	#13282727	29/08/2017	29/08/2017
#13205848	14/08/2017	31/08/2017	-		
#13215583	16/08/2017	31/08/2017	-		
#13255397	23/08/2017	28/08/2017	-		
#13264428	25/08/2017	31/08/2017	-		
#13300669	31/08/2017	03/09/2017	-		
#13301043	31/08/2017	05/09/2017	-		
#13317590	05/09/2017		-		

Tabla Historial de Tickets

(\*) No registrados por el portal



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## 5. ACCIONES REALIZADAS

Se realiza un seguimiento minucioso de los reclamos y se registran todos los eventos relacionados con las novedades que presentan estos nodos.

Se manifiestan y resaltan las discrepancias que surgen ante un evento a Level 3.

Se utiliza el escalonamiento de Level 3, brindado en la matriz de contactos, para dar celeridad ante la falta de resolución de problemas.

En función de las reiteradas novedades, se procede a realizar el presente informe técnico a los efectos de dar conocimiento de la criticidad de los eventos que se suscitan, y la necesidad imperiosa, para que los nodos NCC Manaos y Maiquetía, cumplan con las disponibilidades óptimas requeridas.

## 6. CONCLUSIÓN

Se recomienda realizar las siguientes acciones:

- a) Exigir a la empresa Level 3 el cambio de proveedor local o reformar las acometidas de última milla, asegurando una alta redundancia y eventual disponibilidad deseada.
- b) Se penalice a la empresa por los incumplimientos en función de lo informado oportunamente por esta administración.

## 7. ANEXOS

ANEXO ALFA (Indisponibilidad obtenida con WUG sin factor de corrección) (ver página 10)

ANEXO BRAVO (TEMAS REUNIÓN CON LEVEL 3 JUNIO 2017) (ver página 18)

ANEXO CHARLIE (Discrepancias) (ver página 19)

ANEXO DELTA (TICKETS EJEMPLO) (ver página 31)

ANEXO ECO (Ejemplo para obtener indisponibilidad mensual aplicando factor de corrección) (ver página 33)



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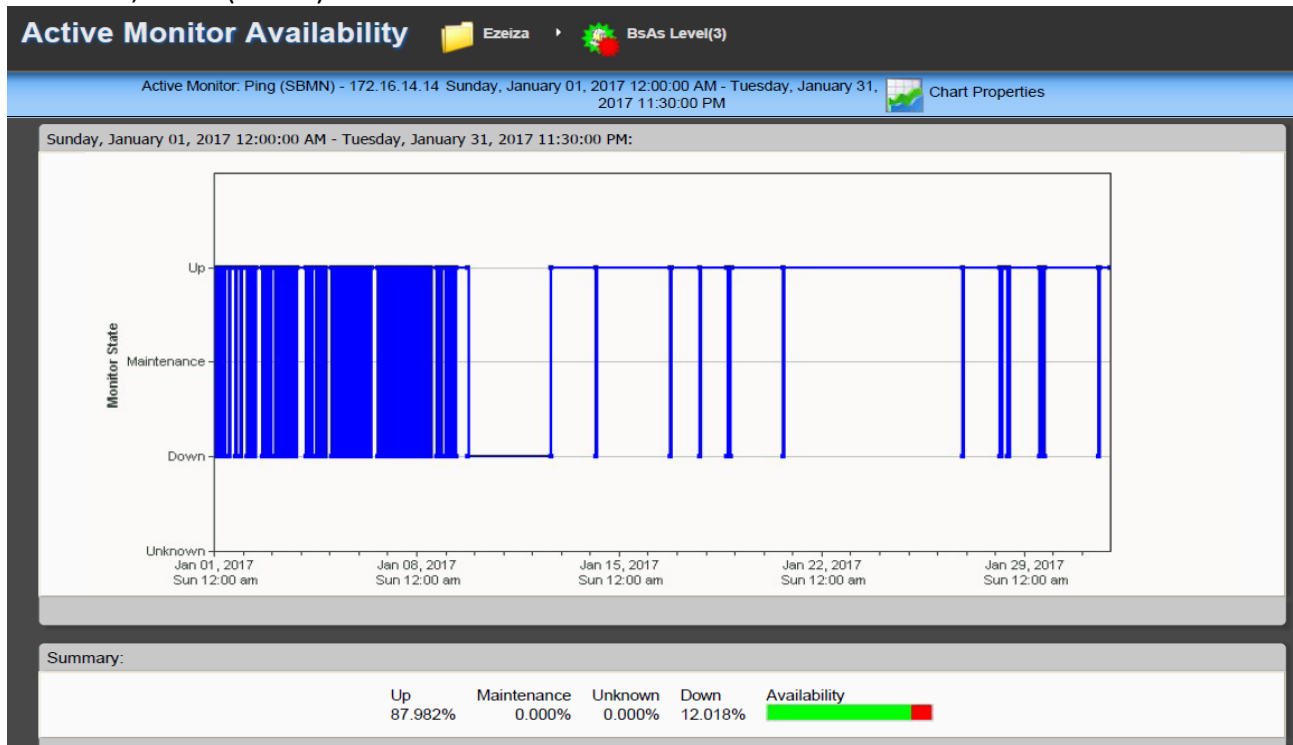
### ANEXO ALFA (Indisponibilidad obtenida con WUG sin factor de corrección)

Registros de disponibilidad por el WUG desde el NCC REDDIG

Estaciones: Manaos y Maiquetía

Manaos desde enero a agosto

Enero: 87,982 % (SBMN)





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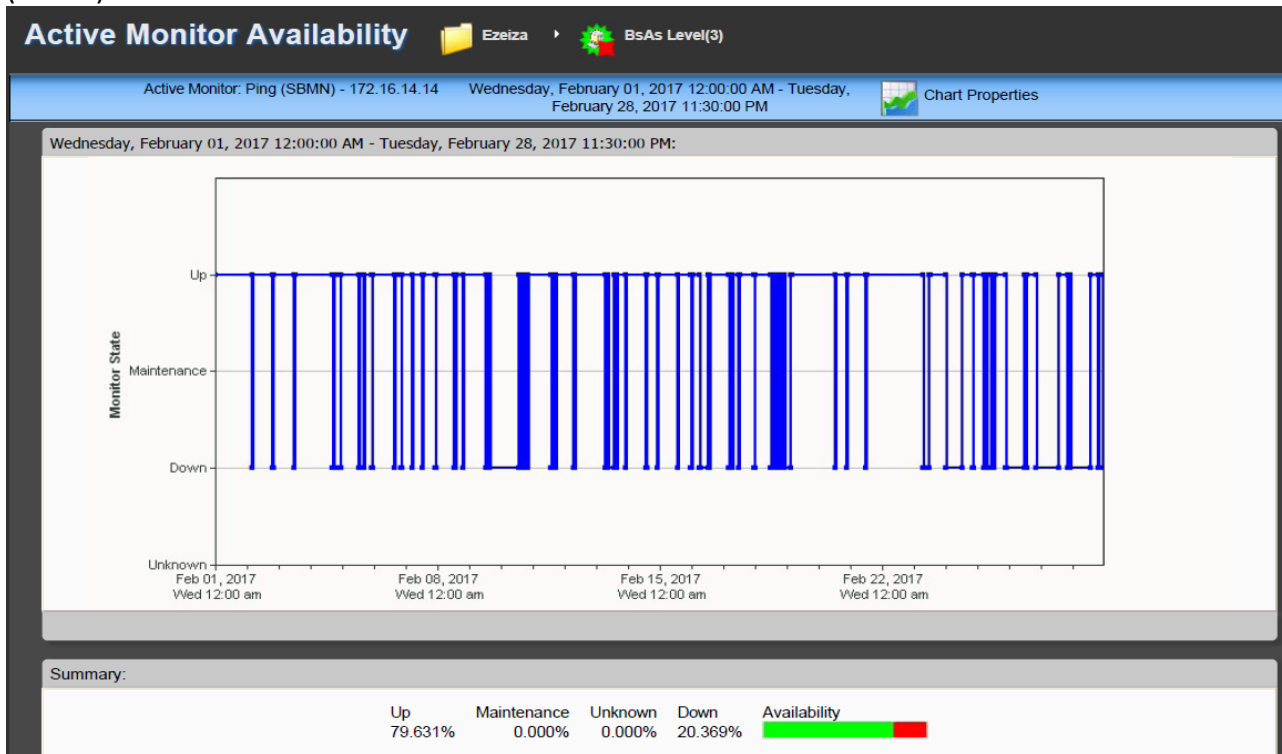
LA AVIACIÓN UNIDA

ORGANISMO ESPECIALIZADO DE LAS NACIONES UNIDAS

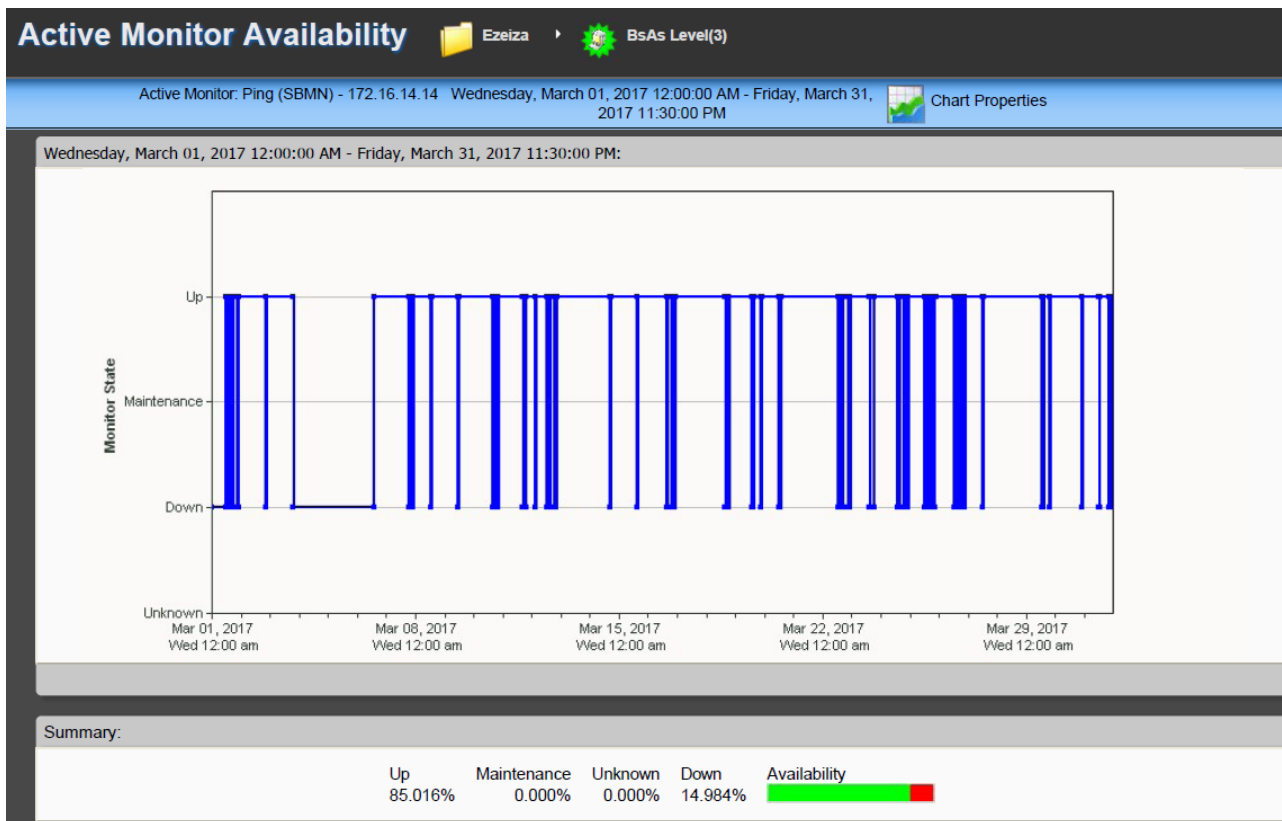


Proyecto Regional RLA/03/901: Sistema de Gestión de la Red Digital Sudamericana REDDIG y Administración del Segmento Satelital

Febrero: 79,631 %  
(SBMN)



Marzo: 85,016 % (SBMN)



Abril: 72,760 % (SBMN)



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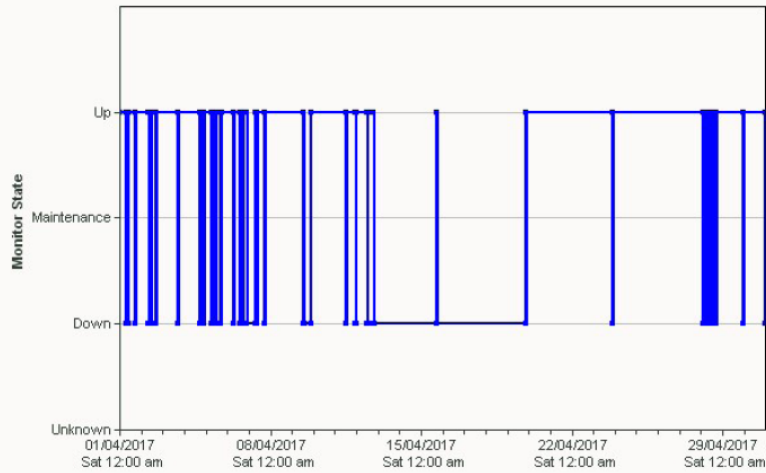
### Active Monitor Availability

Lima LstMle L-3

Active Monitor: Ping (SBMN) - 172.16.14.14 01/04/2017 12:00:00 AM - 30/04/2017 11:30:00 PM

Chart Properties

01/04/2017 12:00:00 AM - 30/04/2017 11:30:00 PM:



Summary:

Up	Maintenance	Unknown	Down	Availability
72.760%	0.000%	0.000%	27.240%	<div style="width: 72.76%; background-color: green; display: inline-block;"></div>

Mayo: 75,046 % (SBMN)

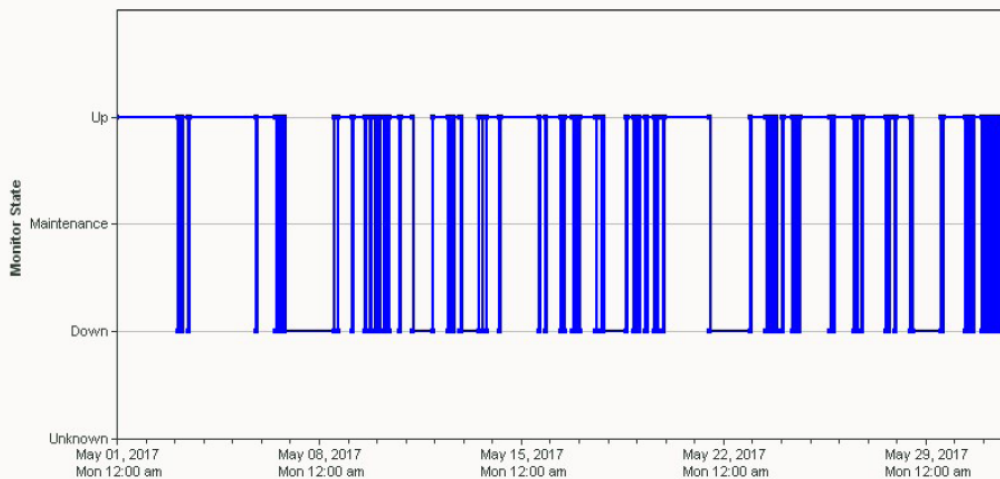
### Active Monitor Availability

Ezeiza BsAs Level(3)

Active Monitor: Ping (SBMN) - 172.16.14.14 Monday, May 01, 2017 12:00:00 AM - Wednesday, May 31, 2017 11:30:00 PM

Chart Properties

Monday, May 01, 2017 12:00:00 AM - Wednesday, May 31, 2017 11:30:00 PM:



Summary:

Up	Maintenance	Unknown	Down	Availability
75.046%	0.000%	0.000%	24.954%	<div style="width: 75.046%; background-color: green; display: inline-block;"></div>

Junio: 79,166 % (SBMN)



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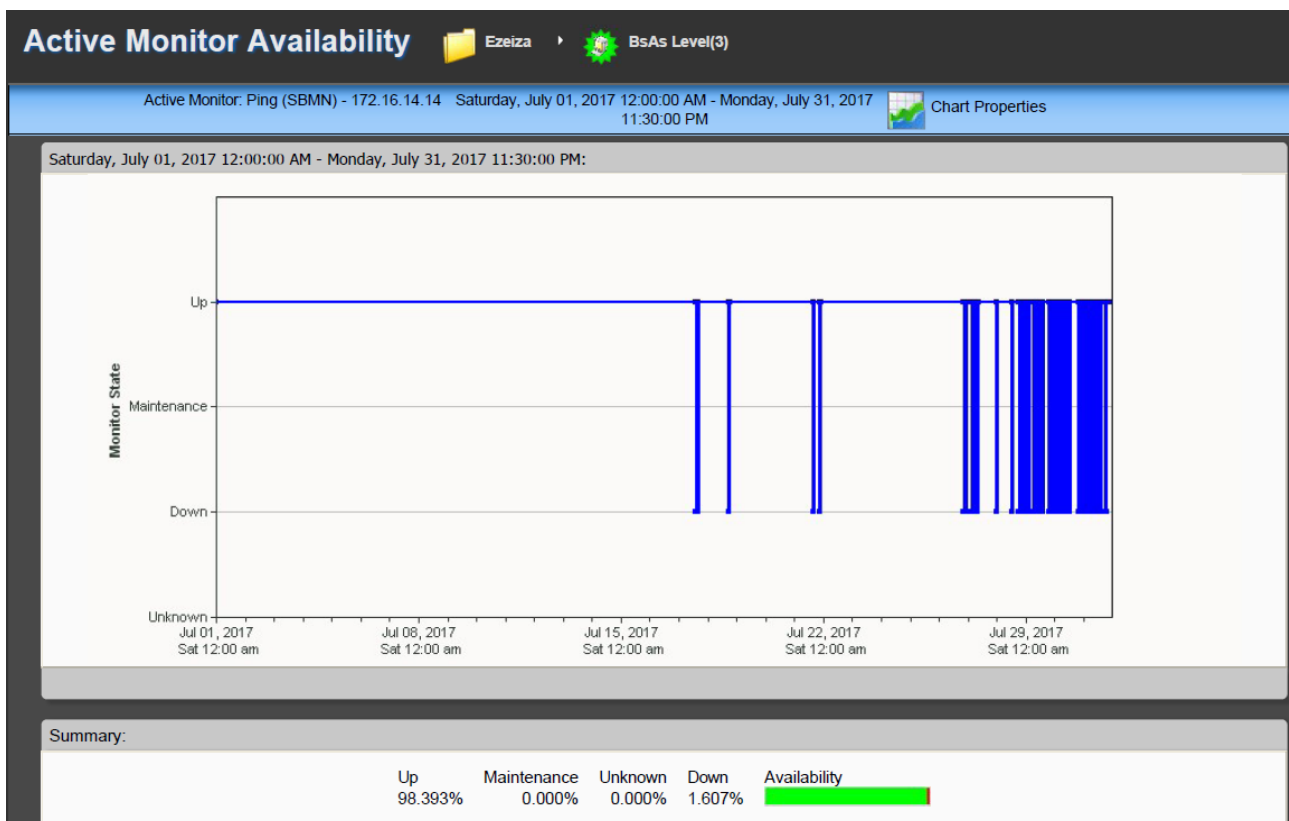
ORGANISMO ESPECIALIZADO DE LAS NACIONES UNIDAS



Proyecto Regional RLA/03/901: Sistema de Gestión de la Red Digital Sudamericana REDDIG y Administración del Segmento Satelital



Julio: 98,393 % (SBMN)



Agosto: 91,552% (SBMN)



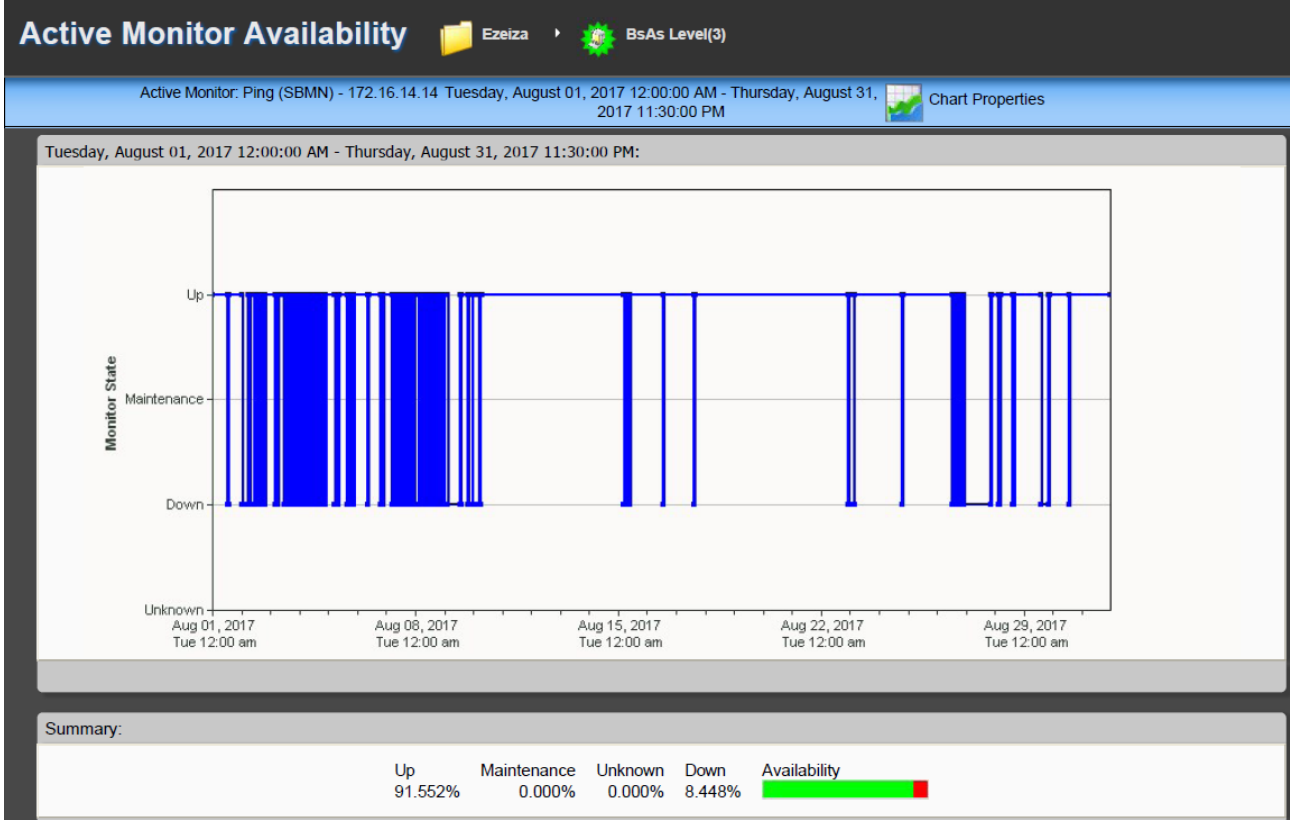
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**Maiquetía desde enero a agosto de 2017**

Enero: 99,324 %  
(SVMl)



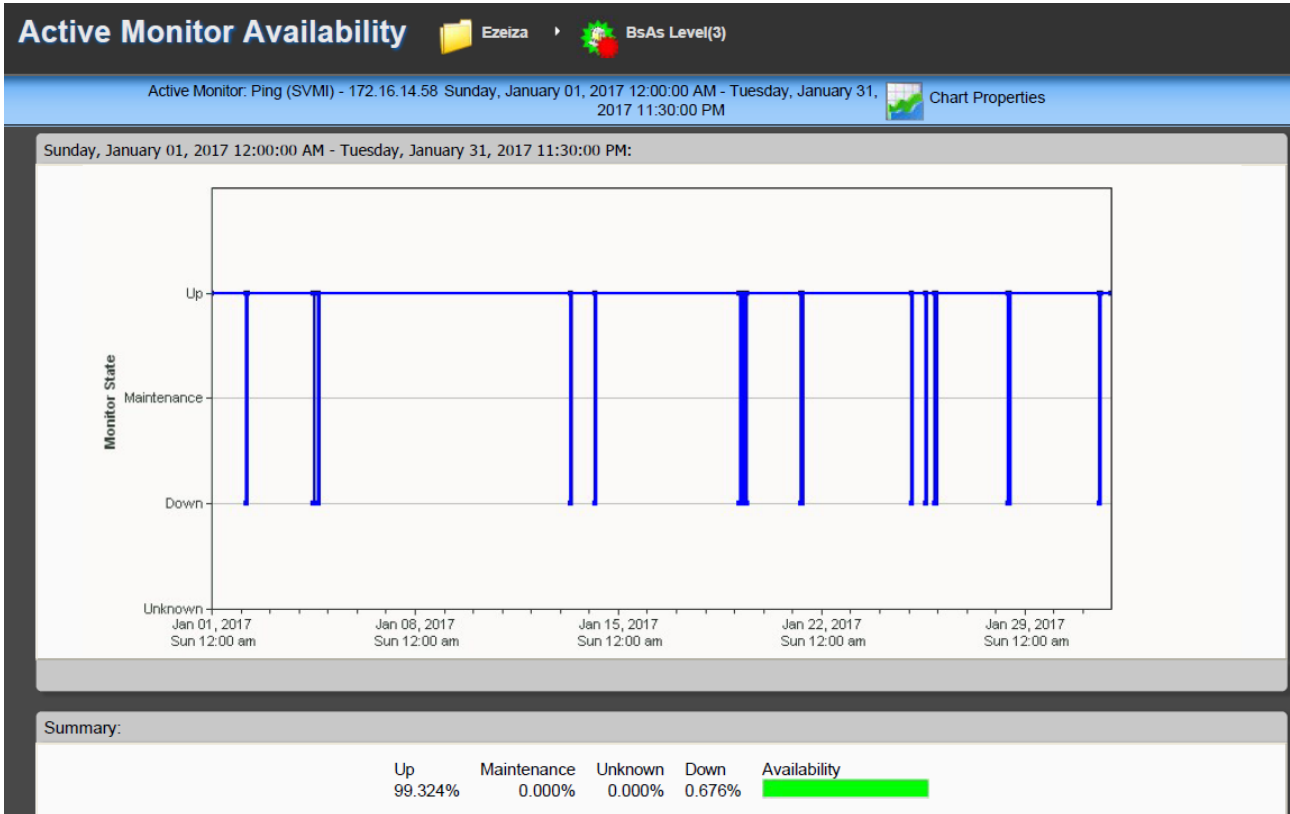
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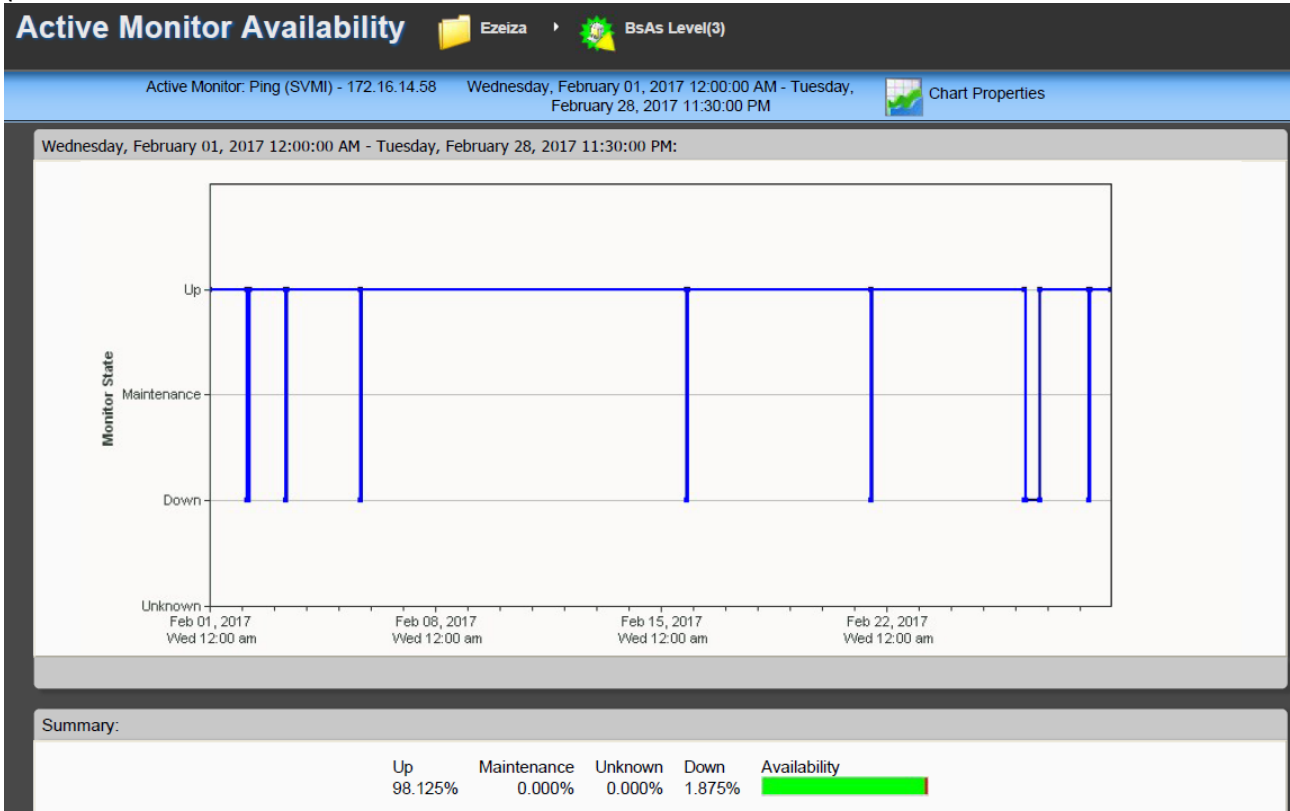
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Febrero: 98,125 %  
(SVM1)



Marzo: 96,342 % (SVM1)



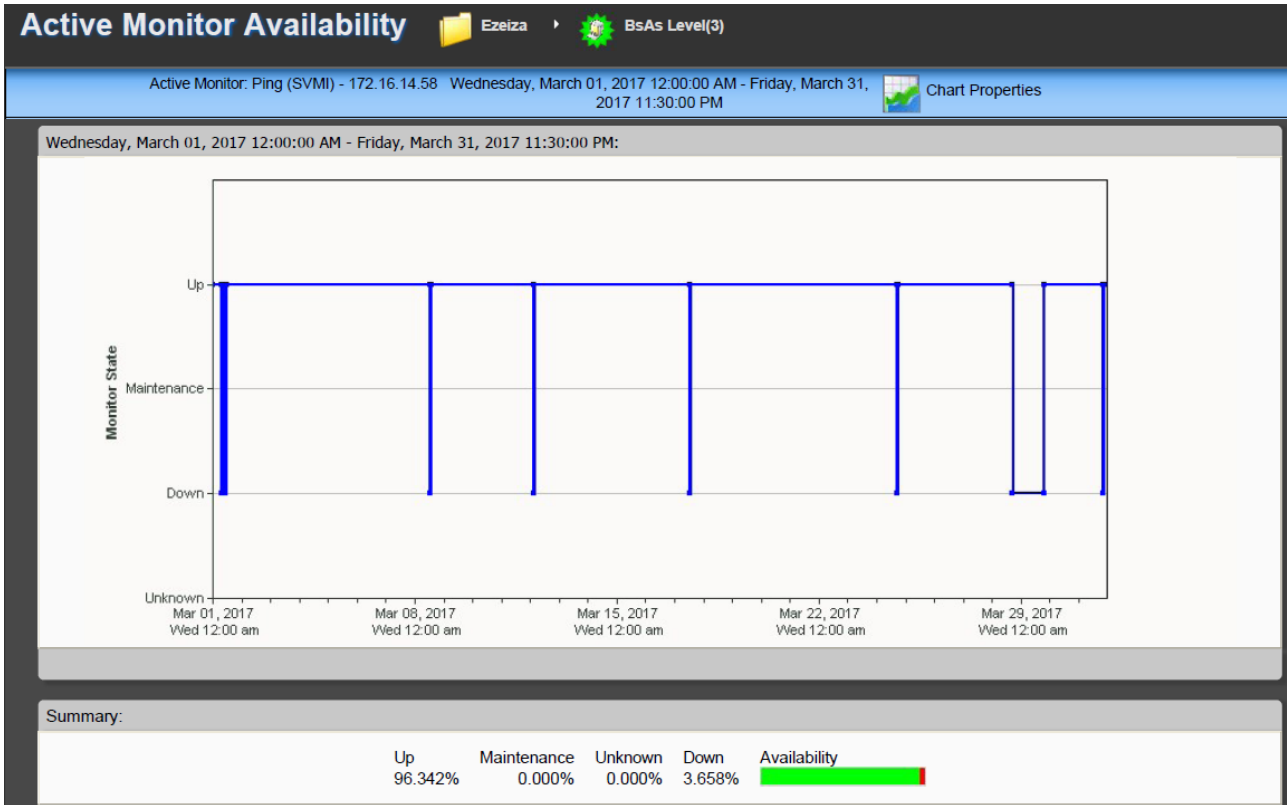
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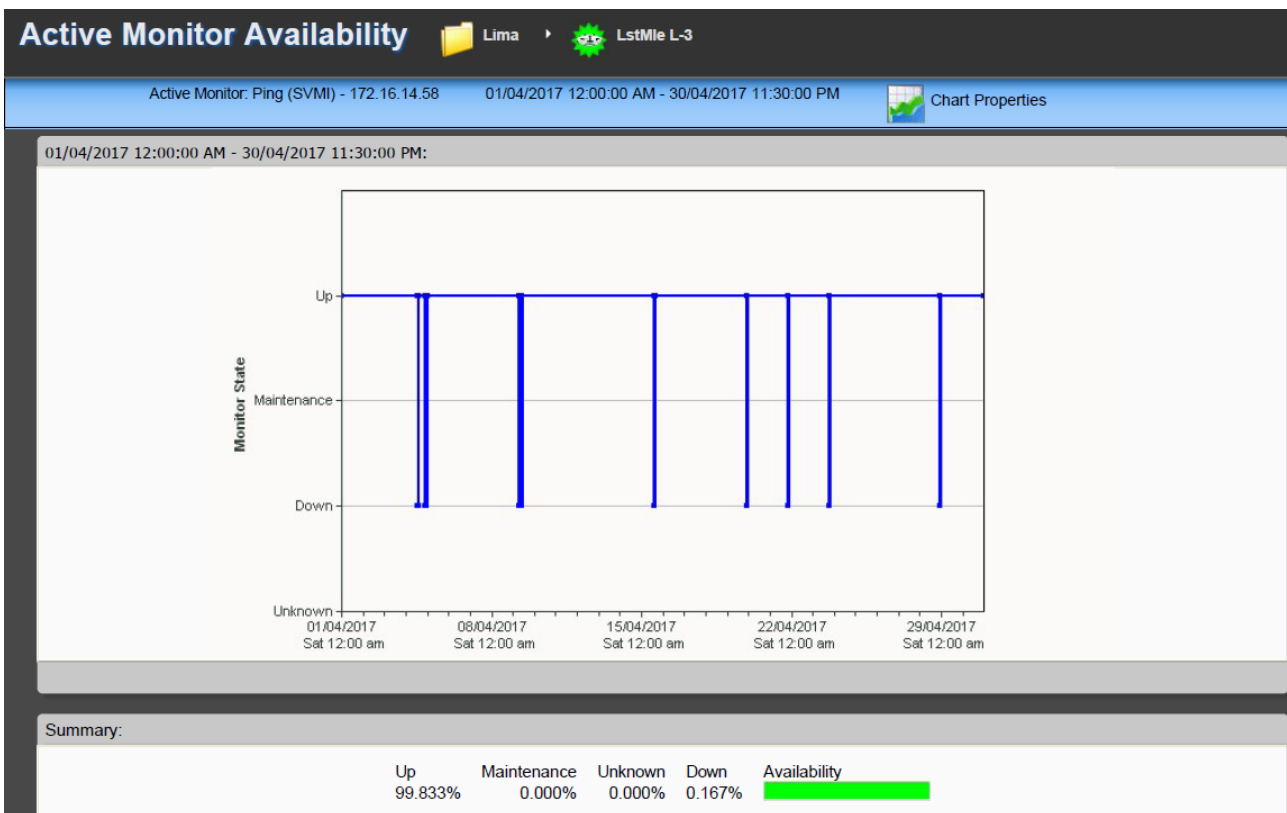
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Abril: 99,833 % (SVMI)



Mayo: 98,128 % (SVMI)



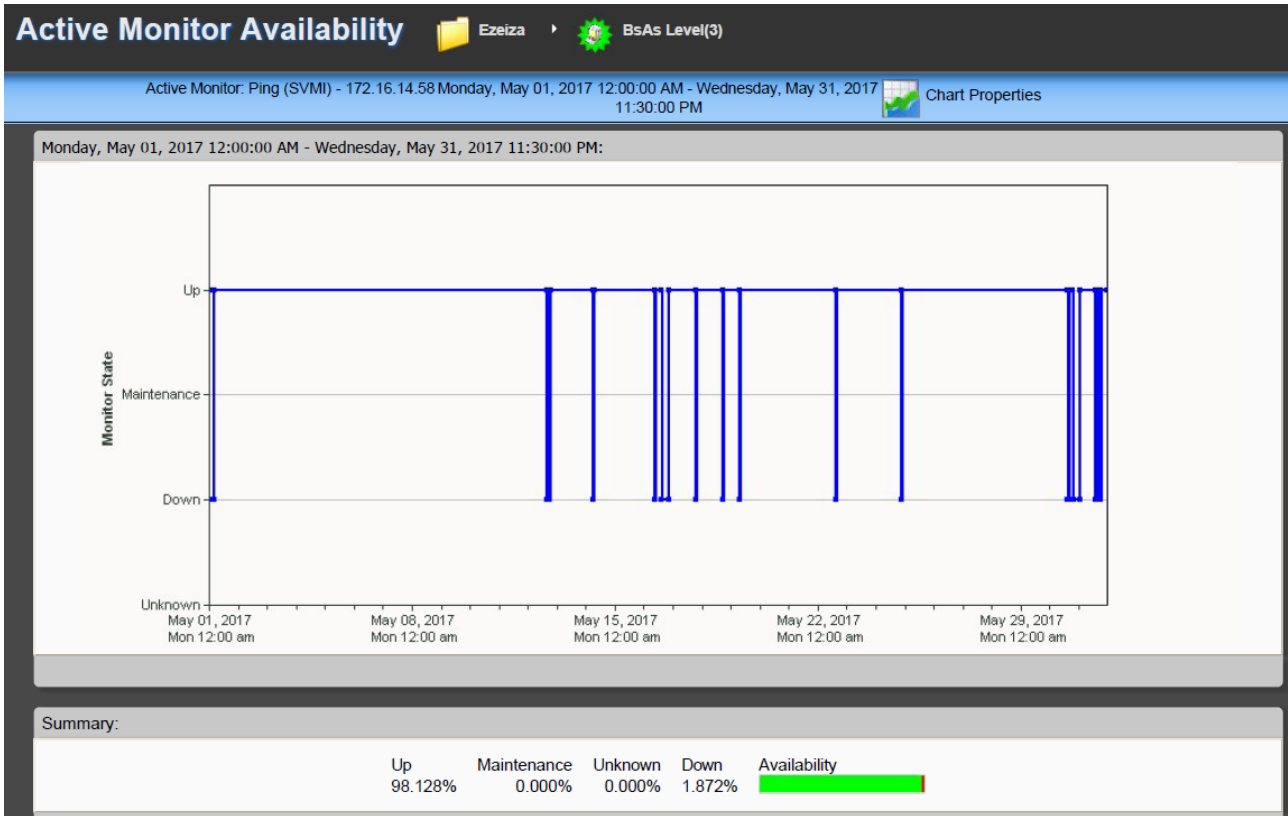
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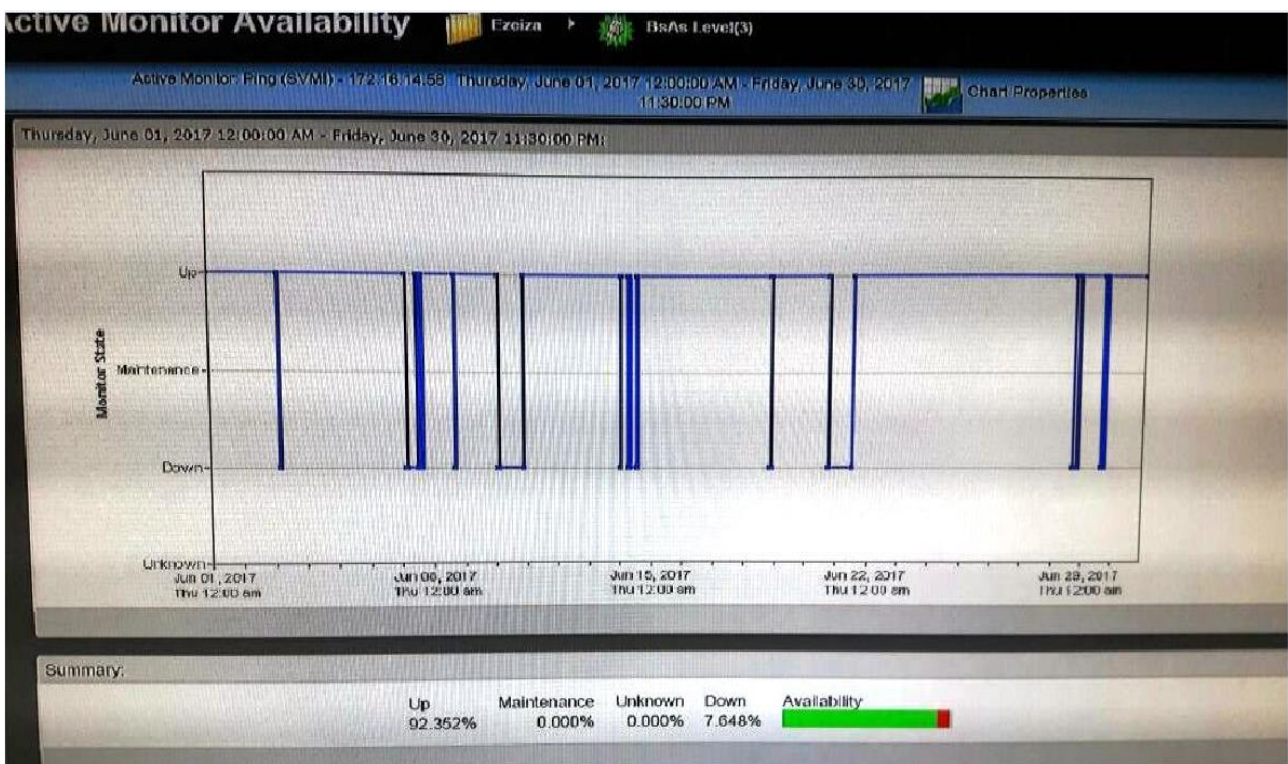
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Junio: 92,352 % (SVMI)



Julio: 99,807 % (SVMI)



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### Active Monitor Availability



Ezeiza



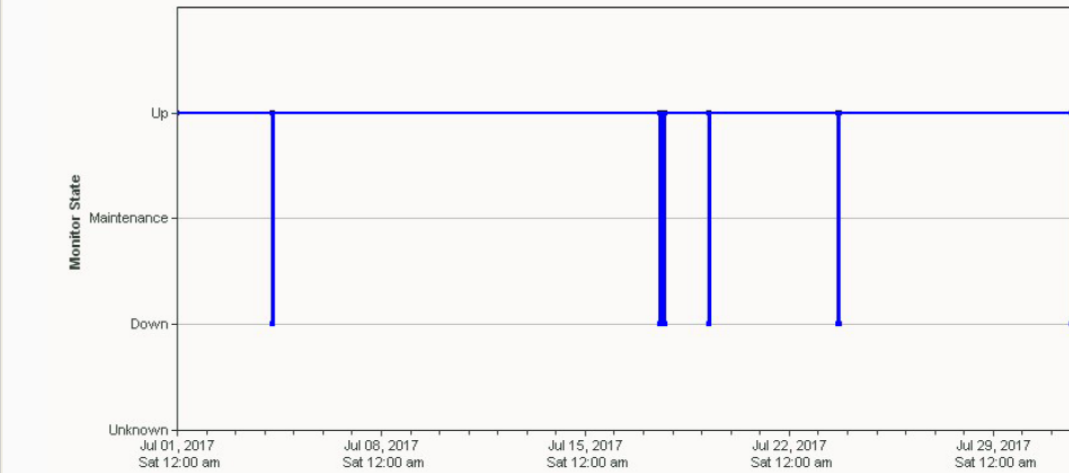
BsAs Level(3)

Active Monitor: Ping (SVMI) - 172.16.14.58 Saturday, July 01, 2017 12:00:00 AM - Monday, July 31, 2017 11:30:00 PM



Chart Properties

Saturday, July 01, 2017 12:00:00 AM - Monday, July 31, 2017 11:30:00 PM:



Summary:

Up	Maintenance	Unknown	Down	Availability
99.807%	0.000%	0.000%	0.193%	<div style="width: 99.807%; height: 10px; background-color: green;"></div>

Agosto: 90,046 %  
(SVMI)

### Active Monitor Availability



Ezeiza



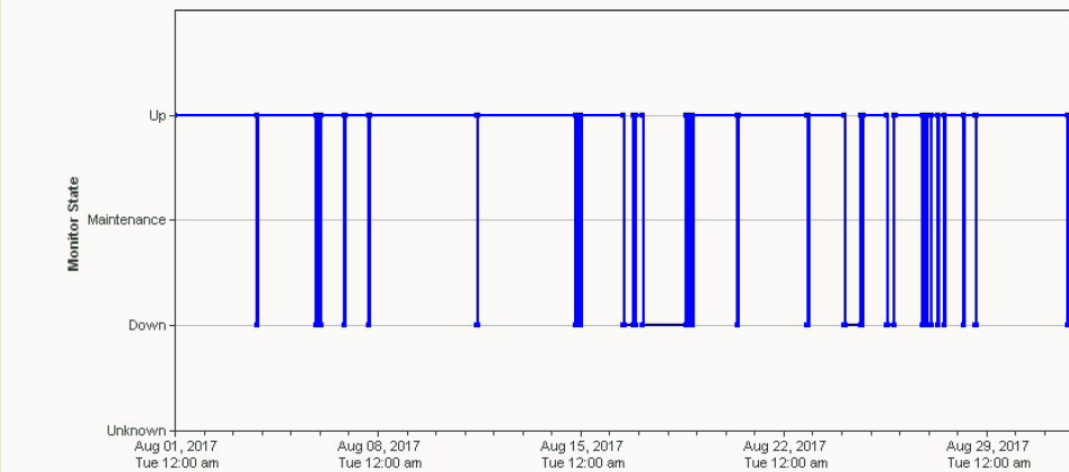
BsAs Level(3)

Active Monitor: Ping (SVMI) - 172.16.14.58 Tuesday, August 01, 2017 12:00:00 AM - Thursday, August 31, 2017 11:30:00 PM



Chart Properties

Tuesday, August 01, 2017 12:00:00 AM - Thursday, August 31, 2017 11:30:00 PM:



Summary:

Up	Maintenance	Unknown	Down	Availability
90.046%	0.000%	0.000%	9.954%	<div style="width: 90.046%; height: 10px; background-color: green;"></div>

### ANEXO BRAVO (TEMAS REUNIÓN CON LEVEL 3 JUNIO 2017)



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Proyecto Regional RLA/03/901: Sistema de Gestión de la Red Digital Sudamericana REDDIG y Administración del Segmento Satelital

**Fecha:** miércoles, 8 de agosto de 2017

**Participantes:** Quiñones, Oliver (ServiceClient Manager Level 3); Ing. Onofrio Smarelli (Oficial Regional CNS SAM); Ing. Cristian Javier Vittor (Administrador de la REDDIG).

Reunión concreta el 8 de agosto

Temas tratados en la reunión, destacando la necesidad de estabilizar los enlaces de los nodos mencionados en la Cuestión 1.

### **Cuestión 1: Solución definitiva a las novedades de los nodos**

- a) **Manaos (Brasil)**
- b) Paramaribo (Surinam)
- c) **Maiquetía (Venezuela)**
- d) Piarco (Trinidad & Tobago)
- e) Tiempos prolongados para dar solución

### **Cuestión 2: Portal de Level 3**

- a) Discrepancias en el historial
- b) Acceso al portal al personal de los Estados
- c) Novedades sobre: uso horario (GTM), duración de la novedad, responsables, estado del ticket
- d) Falta de nodos en las opciones que se presentan en el portal (en gral. falta Brasilia) Puntos de Acceso de Red (Network Access Points (NAPs)).

### **Cuestión 3: ServiceDesk**

- a) Actualización

### **Cuestión 4: Matriz de contactos.**

- a) Actualización

### **Cuestión 5: Últimas millas**

- a) Facilitar a la OACI la topología con la información correspondiente (proveedor, tipo de enlace, NAPs(Network Access Points), etc)

### **Cuestión 6: Notas de crédito**

- a) Verificar si se están confeccionando las notas de crédito en función de la disponibilidad mensual reportada
- b) Coordinar mensualmente sobre SLA en cuanto a las disponibilidades

## **ANEXO CHARLIE (Discrepancias)**

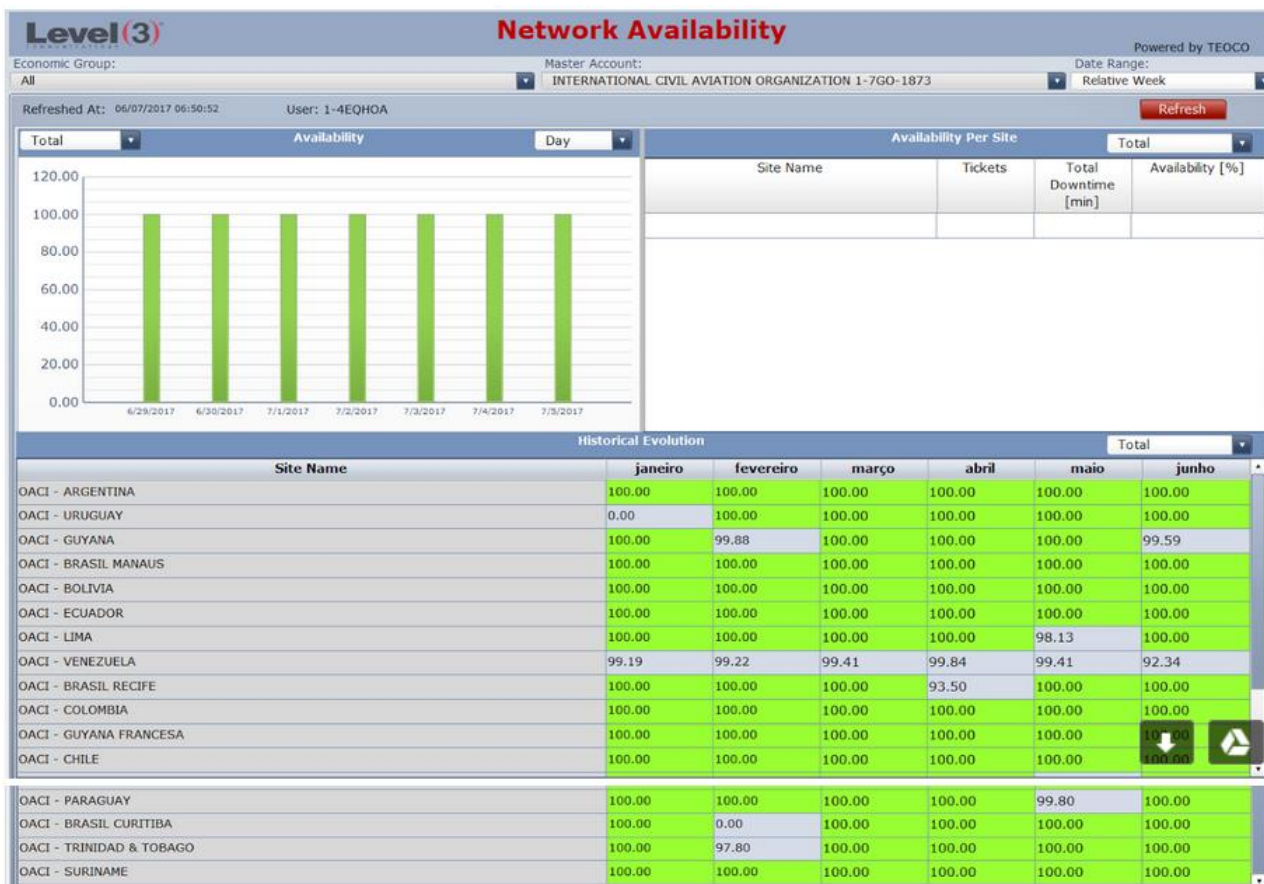


### Discrepancias con Level 3

En el mes de junio no se contaba con un nivel de administrador en el portal de Level 3. Se enumeran algunas cuestiones que se plantearon al principio:

- 1) no se tenía posibilidades de crear o eliminar usuarios y asignar niveles.
- 2) referentes a la disponibilidad de la red, se observaron discrepancias, en particular, porque Level 3 se basa en los tickets lo cual debe reverse por la gran cantidad de datos incongruentes.

En la página de Level 3 aparecía, como disponibilidad, lo siguiente:



Y difiere de lo que nosotros obtenemos, que para el caso testigo, salvo Venezuela y Guyana que están casi iguales, teniendo en cuenta que la Administración de la REEDDIG aplica un factor de corrección a favor de Level 3.



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CIRCUITS	Measured	Offered	Difference	MRC USD	Credit USD	
SBMN	79,43%	99,50%	20,07%	1.500,00	301,11	
SVMI	92,61%	99,70%	7,09%	2.190,00	155,23	
SPIM	98,60%	99,70%	1,10%	830,00	9,15	
SYGC	99,57%	99,70%	0,13%	3.850,00	4,85	
SBRF	98,88%	99,70%	0,82%	1.050,00	8,58	
					478,91	TOTAL CREDIT USD
					Jun 2017	

Se observa en el ejemplo que Manaus muestra un 100% cuando se ha demostrado que este servicio presenta innumerables cortes de la última milla de Level 3.

No queda claro como se obtiene un 100% que es algo virtual más que real o que otros parámetros puedan ser utilizados para llegar a ese porcentaje.

3) Otra discrepancia es que, si uno mira el portal de Level 3, en la parte de historial de tickets, no coincide la información presentada con los reclamos que se realizan. Un ejemplo concreto:

El día 13/06/2017, se realizó desde el NCC de Manaus un reclamo a Level 3 por caída del vínculo terrestre en Manaus. El número de reclamo que le otorgaron desde el centro de gestión de Level 3 al Sg. Meneses fue el Nro. 12874342/2017.

En ese momento, si uno ingresaba este número en el buscador de tickets del portal, no aparecía. Si uno miraba el historial en el portal, saltaba del 13/06/2017 (reclamo de Recife que es otro caso) al 09/06/2017. Y no se observaba el reclamo en cuestión.

TICKETS FECHADOS

Ordenar: Últimos | Contas: INTERNATIONAL CIVIL | Servicios: Todos os serviços | Buscar

332 tickets

<p>#12877312</p> <p>Status: FECHADO</p> <p>Título: Transport Protected Network Event ~ Recife, Brazil to Salvador, Brazil</p> <p>Abertura: 13/06/2017</p> <p>Fechado: 15/06/2017</p> <p>Tipo: Incidente</p> <p>Servicio: IP VPN</p> <p>Criador: Carlos Paes</p>	<p>#12865441</p> <p>Status: FECHADO</p> <p>Título: NM VEN OACI - VENEZUELA CAÍDA IMPE_V N_1-4IHF2Z    CAÍDA BGP</p> <p>Abertura: 09/06/2017</p> <p>Fechado: 20/06/2017</p> <p>Tipo: Incidente</p> <p>Servicio: IP VPN</p> <p>Criador: L. Escobar</p>	<p>#12844115</p> <p>Status: FECHADO</p> <p>Título: NM    VEN    INTERMITENCIA    OACI - VENEZUELA    IMPE_VN_1-4IHF2Z    HORARIO COMERCIAL</p> <p>Abertura: 06/06/2017</p> <p>Fechado: 13/06/2017</p> <p>Tipo: Incidente</p> <p>Servicio: IP VPN</p> <p>Criador: L. Escobar</p>
#12834875	#12820468	#12802708

El día 8 de julio se cambia el perfil de usuario operador a administrador del Admin de la REDDIG.



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Las consultas sobre el portal se trasladaron a los administradores del portal para su revisión respecto a la indisponibilidad de los enlaces y los tickets que se muestran.

Fecha: 13 de julio de 2017, 9:21

Asunto: Novedades. Por portal y discrepancias

Para: "Quinones, Oliver" <Oliver.Quinones@level3.com>

Cc: "Smarrelli, Onofrio" <osmarrelli@icao.int>

A la fecha no se tuvo devolución sobre las discrepancias observadas.

Ese día de la fecha se presentó una caída en el link de Level 3 de Manaus. El mismo fue reclamado a las 06:40hs local con Ticket Nro 13041009/2017. El reclamo fue telefónico y por las llamadas recibidas era un tema por problemas de última milla.

Se ingresó al portal para verificar si el reclamo estaba reflejado en la parte de tickets y NO estaba registrado. A fin de dejar asentada la novedad, se abrió un nuevo ticket haciendo referencia al original para que quede en el portal el registro de este evento. El ticket generado en el portal es 13041733/2017, y hace referencia al primero.

Archivos de referencia.

DETALHE DO TICKET #13041733 /2017 ☆

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**Detalhe do ticket de pedido**

Status:	<b>EM PROCESSO</b>	Criador:	Eraldo Meneses
Abertura:	13/07/2017	Serviço:	IP VPN
Tipo:	Incidente	Local:	ORGANIZACION DE AVIACION CIVIL INTERNACIONAL - FC USD MENSUAL
Sobrenome do contato no local:	Meneses	Conta:	INTERNATIONAL CIVIL AVIATION ORGANIZATION
Número do contato no local:	559236525712	Nome do contacto:	Eraldo
		E-mail do contato no local:	javiervittor@gmail.com
Título:	<b>link fuera de servicio</b>	Detalle subtipo:	IP VPN
Descrição:	se abriu un ticket a las 6:40hs local del día 13/07/2017 nro 13041009/2017 y no se registra en tickets abierto. Al momento sigue fuera de servicio	Gravedad:	Urgent
Archivos anexados:			

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**Notas do ticket**

Adicionar comentário

Insira o texto da nota

Adicionar comentário Cancelar



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Se manifiesta predisposición para colaborar en mejorar el portal, el cual, si se corrigen algunas cuestiones importantes, se considera como una herramienta muy importante.

Hola Javier,

Anteriormente he pasado tu requerimiento al área encargada del portal de clientes, ellos se encuentran trabajándolo, pero lamentablemente estos cambios no son inmediatos.

Te aviso cualquier novedad.

Saludos,

**Oliver Quiñones**

ServiceClient Manager

Level 3 Communications

Manuel Olguin 395, Santiago de Surco

Lima 33 – Lima, Perú

t: +51-1-705-5749

c: +51-985-855749

e: [oliver.quinones@level3.com](mailto:oliver.quinones@level3.com)

**From:** Javier Vittor [mailto:jvittor@icao.int]

**Sent:** Thursday, August 24, 2017 6:52 AM

**To:** Prada, Miguel <Miguel.Prada@Level3.com>; Quinones, Oliver <Oliver.Quinones@Level3.com>



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**Cc:**Smarrelli, Onofrio<osmarrelli@icao.int>; Diaz, Luis <Luis.Diaz@Level3.com>

**Subject:**sistema de ticket

Estimados Miguel y Oliver,

Insisto en que en el historial de ticket debe agregarse la hora por cada evento que se registra.

Ing. Cristian Javier Vittor

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**De:** Javier Vittor [mailto:jvittor@icao.int]

**Enviado el:** jueves, 17 de agosto de 2017 06:52 a.m.

**Para:**Quinones, Oliver <Oliver.Quinones@Level3.com>

**CC:**Smarrelli, Onofrio<osmarrelli@icao.int>; l.escobar@inac.gob.ve; v.fiore@inac.gob.ve; giuliozoino@gmail.com; olivermag@hotmail.com; Prada, Miguel <Miguel.Prada@Level3.com>

**Asunto:** RE: por novedad de Maiquetía - Venezuela (ticket #13215583)

Estimado Oliver,

Referente al ticket #13215583 (Maiquetía-Venezuela), el enlace sigue fuera de servicio. Recuerdo que la novedad comenzó ayer a las 11:25hs UTC aprox (07:25hs Local Manaos). En el portal lo que aparece es lo siguiente:

***“Estimado Cliente, El proveedor de ultima milla nos informan que el día de mañana retomaran trabajos ya que en el día de hoy no se le dio acceso a la selda. Le estaremos informando en la brevedad posible sobre los avances del caso”***

En tal sentido, también vale recordar lo que conversamos en la reunión que mantuvimos en Lima en donde en la Cuestión 1 hacíamos referencia a los reiterados inconvenientes que tenemos con estos nodos y la necesidad de estabilizar la situación y tener una respuesta más rápida en la solución del problema. Ya pasaron 24hs desde que se detectó la novedad y todavía no está resuelta.

Recuerda que hablamos de servicios críticos esenciales para la aviación civil, y que el mes próximo la red de Level 3 será fundamental para soportar la afectación que tendrán las estaciones satelitales con motivos de las explosiones solares.

Espero que hoy se pueda resolver lo de Maiquetía.

Te reitero dos pedidos:

Actualizar en la matriz de contactos, los contactos de Level 3.

- 1) Topología de última milla de Level 3

Ing. Cristian Javier Vittor

---

**De:** Javier Vittor

**Enviado el:**quarta-feira, 16 de agosto de 2017 14:02

**Para:** 'Quinones, Oliver'

**CC:**Smarrelli, Onofrio

**Asunto:** Actualización matriz de contactos. Seguimiento a los temas tratados en la reunión

Estimado Oliver,

Te comento que hoy, desde 11:25 hs utc aproximadamente, el enlace de Maiquetía está fuera de servicio. Este era un nodo de los cuales hablamos en la reunión que hay que normalizar.



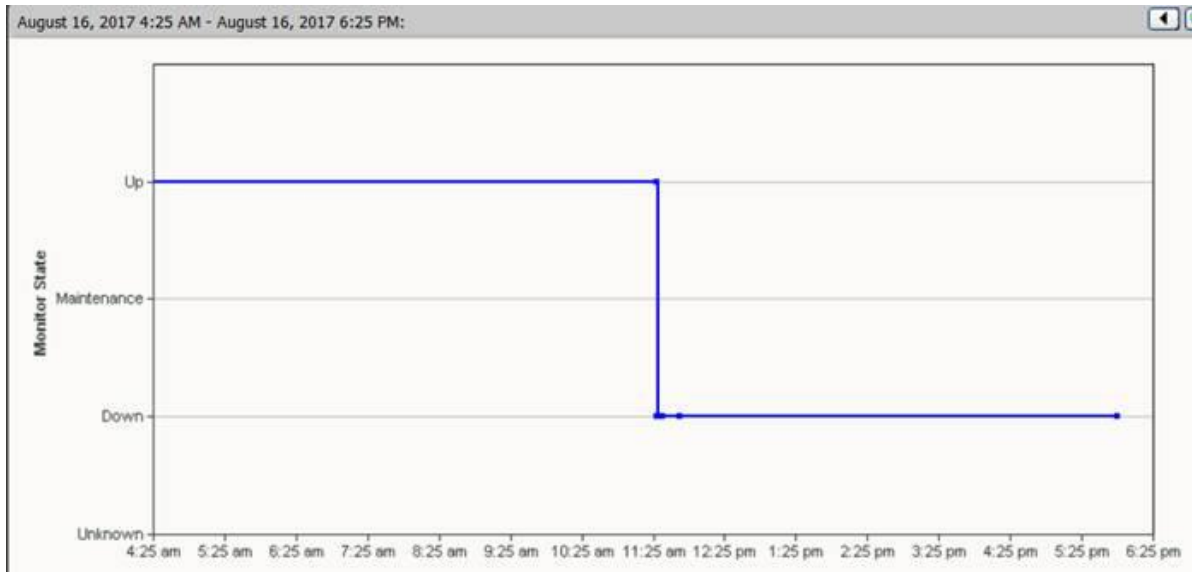
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Te paso en adjunto la “Matriz de contactos” actualizada y necesito que me la devuelvas con la actualización de los contactos de Level 3 en la planilla.

Ing. Cristian Javier Vittor

.....  
**From:** Javier Vittor [mailto:jvittor@icao.int]

**Sent:** Thursday, August 17, 2017 2:49 PM

**To:** Quinones, Oliver <Oliver.Quinones@Level3.com>

**Cc:** Smarrelli, Onofrio <osmarrelli@icao.int>; Prada, Miguel <Miguel.Prada@Level3.com>; eraldomenezes@gmail.com

**Subject:** RE: Actualización matriz de contactos. Seguimiento a los temas tratados en la reunión

Estimado Oliver,

A continuación una sugerencia más sobre el portal y relacionado con el registro de historial de los tickets.

El siguiente es un extracto del ticket generado por Maiquetía que sigue fuera de servicio desde ayer a las 07:25hs local de Manaos (11:25hs UTC).



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por favor, incorporar en el historial del ticket un campo "HORA" en donde se registre, justamente, el horario de actualización del mismo y no solo la fecha

Data	Criador	Descrição
17/08/2017	abreug	Estimado cliente, la presente es para indicarle que nuestro proveedor hizo revision de los equipos que tienen en el nodo donde se detecto que uno de los equipos de acceso se encuentra dañado el cual amerita ser remplazado, nuestro proveedor se encuentra validando la disponibilidad del respuestro para realizar dicho cambio, al momento de contar con algún nuevo avance le estaremos indicando por este medio. Le ofrecemos disculpas por las molestias ocasionadas Geraldine N. Abreu
17/08/2017	abreug	Estimado cliente, nuestro proveedor cuenta con personal tecnico en el nodo haciendo revision fisica en los equipos, al momento de contar con algun avance le estaremos informando. Saludos cordiales Geraldine N. Abreu
17/08/2017	abreug	Estimado cliente, la presente es para indicarle que el servicio se observa caído desde hace 11 horas: #show ip bgp vprn4 vrf ineo sum     172.16.14.58 172.16.14.58 4 65114 0 0 1 0 0 11:12:44 Active Por tal motivo nuestro proveedor se encuentra gestionando el envio de personal técnico al nodo de acceso con el fin de realizar revisiones fisicas en los equipor al momento de contar con la hora en el cual se contará con personal tecnico en dicho punto le estaremos indicando por este medio. Le ofrecemos disculpas por las molestias ocasionadas Geraldine N. Abreu
16/08/2017	delacuzy	Estimado Cliente, El proveedor de ultima milla nos informan que el dia de mañana retomaran trabajos ya que en el dia de hoy no se le dio acceso a la selda. Le estaremos informando en la brevedad posible sobre los avances del caso.
16/08/2017	delacuzy	18:02 Se llama Movistar, Nos informa Gabriel Betancour se observa Interferencia de frecuencia, el personal de campo trato de llegar al sitio pero no le permitieron ingresar a la Selda. El dia de mañana intentaran ingresar a la Selda.
16/08/2017	fuentesl	Estimado cliente, Nuestro proveedor de última milla nos indica que la incidencia es a consecuencia de una falla en la Estación de Transmisión ADUANA_AEREA debido a que no se posee gestipon en uno de los equipos de agregación. El personal de campo se encuentra realizando las verificaciones pertinentes en la Esatación. Le estaremos informando en la brevedad posible sobre los avances del caso. Saludos.
16/08/2017	fuentesl	Se conversó con el Sr. Claudio Rullero (Movistar)

Ing. Cristian Javier Vittor

**De:** Quinones, Oliver [<mailto:Oliver.Quinones@Level3.com>]

**Enviado el:** quinta-feira, 17 de agosto de 2017 13:34

**Para:** Javier Vittor

**CC:** Smarrelli, Onofrio

**Asunto:** RE: Actualización matriz de contactos. Seguimiento a los temas tratados en la reunión

Hola Javier,

Ya me encuentro trabajando está matriz.

Sobre los otros puntos revisados en la reunión, espero cerrar varios de ellos entre esta y la siguiente semana.

Saludos,

Oliver Quiñones

**De:** Javier Vittor

**Enviado el:** sexta-feira, 18 de agosto de 2017 08:21

**Para:** 'Quinones, Oliver'

**CC:** Smarrelli, Onofrio; 'miguel.prada@level3.com'; 'eraldomenezes@gmail.com'

**Asunto:** RE: Actualización matriz de contactos. Seguimiento a los temas tratados en la reunión

Estimado Oliver,

Referente a Maiquetía, si bien sabemos que están en proceso de conseguir un repuesto y que supuestamente hoy se resuelve, reitero lo conversado en la reunión, sobre estos nodos en particular y los tiempos para solucionar las novedades que se presentan. Al momento llevamos más de 48hs sin el servicio.

Saludos.

Ing. Cristian Javier Vittor



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Proyecto Regional RLA/03/901: Sistema de Gestión de la Red Digital Sudamericana REDDIG y Administración del Segmento Satelital

13 de julio de  
2017, 19:41

asunto: Re: Level (3) Ticket #: 13041733, INTERNATIONAL CIVIL AVIATION ORGANIZATION-5-CMGZRHYJ, Ticket Cerrado, Ticket del Cliente:

Estimado Jorge,

En función de la misma, puedo inferir el motivo por el cuál nuestras estadísticas de disponibilidad generalmente no concuerdan con las presentadas por Level 3. Sería interesante ver cómo podemos trabajar para mejorar el mecanismo. Supongo que Uds, deben tener un WhatsUp o herramienta similar que les permite tener mayor exactitud sobre la disponibilidad y con la que deben estar complementando este sistema de disponibilidad por tickets.

Otra observación que puedo hacer es la presentación de gráficos del portal que muestra datos sin sentido, como así también direcciones ips que deben ser propias de la red MPLS de Level 3 y no tienen relevancia para nosotros. Estar averiguando que identifican esas direcciones implica que tengamos que estar intentando ingresar a la red de Level 3, lo cual no corresponde.

Insisto en lo que manifesté en un mail anterior, considero que este portal representa para nosotros una herramienta muy importante, pero se deben corregir algunas cosas para que sea más confiable.

Quedamos atentos y con la predisposición a colaborar en lo que Uds. consideren.

Saludos, atte.

Ing. Cristian Javier Vittor

.....  
**El Sr. Jorge ChuKoo**, ServiceClient Manager, Product& marketing de Level 3 Communications, Perú, en su mail del 13 de julio de 2017, 20:23, Chu, Jorge <[Jorge.Chu@level3.com](mailto:Jorge.Chu@level3.com)> escribió:

Estimado Javier,

De acuerdo a su mail con sus apreciaciones del portal, también se ha escalado al área correspondiente para su revisión, apenas se tenga unas respuestas nos estaremos comunicando.

Con respecto a otras de sus consultas:

- **La disponibilidad de los informes son basados en los tickets generados, no son directamente tomados del portal, adicional se hacen revisiones de los tickets involucrados en los tiempos de disponibilidad.**
- También se estará revisando al interno con el área a cargo la falta de nodos en la herramienta para las gráficas de los enlaces.



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Satelital

**Sent:** Thursday, July 13, 2017 9:45 AM

**To:** Chu, Jorge <Jorge.Chu@Level3.com>

**Cc:** Quinones, Oliver <Oliver.Quinones@Level3.com>; Quezada, Katherine  
<Katherine.Quezada@Level3.com>; Smarrelli, Onofrio <[osmarrelli@icao.int](mailto:osmarrelli@icao.int)>

**Subject:** Re: Level (3) Ticket #: 13041733, INTERNATIONAL CIVIL AVIATION ORGANIZATION-5-CMGZRHYJ,  
Ticket Cerrado, Ticket del Cliente:

Estimado Jorge,

Gracias por tú pronta respuesta. Puedo decir que a primera hora, cuando ingresé a portal para verificar el reclamo que se hizo a las 06:40hs, el 13041009, no figuraba, no estaba. Esto ya ha ocurrido.

A partir de este tipo de situaciones, puedo entender las discrepancias que tenemos respecto a la disponibilidad del servicio.

La respuesta o envío por parte de Level 3 ante el reclamo es a partir de no ver reflejado el mismo en el portal. Hay diferencias entre los reclamos reales y lo que muestra el portal.

Por favor, ver el mail en donde también hago otras observaciones sobre el portal.

.....  
El 13 de julio de 2017, 10:26, Chu, Jorge <[Jorge.Chu@level3.com](mailto:Jorge.Chu@level3.com)> escribió:

Estimado Javier,

Por el mismo caso se tenía 2 ticket generados **13041009** y **13041733**, el ticket em mención **13041733** ha sido cerrado por duplicidad de caso y se está trabajando con el ticket **13041009**. Quienes están en contacto con Uds. para la revisión del servicio.

En el mail de notificación que recibo, ver mail infra que nos envía, esta esta observación como motivo del cierre del caso.

\*\*\* CASE CLOSE SUMMARY 13-Jul-2017 13:21:15 GMT medeiros.wallace

The ticket 13041009/2017 is still open and we are also analyzing the circuit issue through it.

This ticket will be closed as duplicated ticket.

Your telephone number and email address will be added on the ticket 13041009/2017 to keep you update.

\*\*\* Email Out 13-Jul-2017 13:21:30 GMT EMAIL\_TKT\_APPUSER

FROM : Email Out, IN LANGUAGE: Spanish, TO:  
[lalej@icao.int](mailto:lalej@icao.int), [javiervittor@gmail.com](mailto:javiervittor@gmail.com), [reddig@corpac.gob.pe](mailto:reddig@corpac.gob.pe)



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Con respecto al tema del portal, se estará escalando al interno la revisión de los que nos indica, actualmente he probado y si muestra la información de los tickets.

Jorge Chu Koo

Service Client Manager

**From:** Javier Vittor [mailto:[javiervittor@gmail.com](mailto:javiervittor@gmail.com)]

**Sent:** Thursday, July 13, 2017 8:31 AM

**To:** Quinones, Oliver <[Oliver.Quinones@Level3.com](mailto:Oliver.Quinones@Level3.com)>; Quezada, Katherine <[Katherine.Quezada@Level3.com](mailto:Katherine.Quezada@Level3.com)>; Chu, Jorge <[Jorge.Chu@Level3.com](mailto:Jorge.Chu@Level3.com)>

**Cc:** Smarrelli, Onofrio <[osmarrelli@icao.int](mailto:osmarrelli@icao.int)>

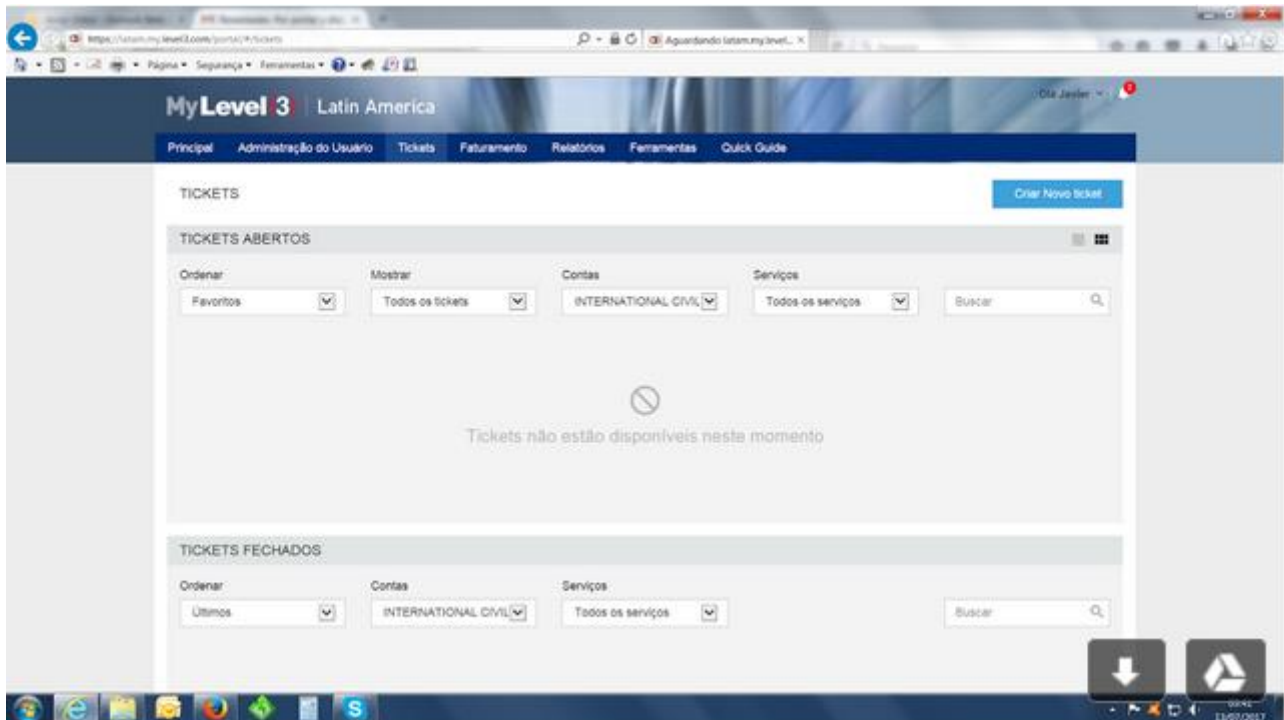
**Subject:** Fwd: Level (3) Ticket #: 13041733, INTERNATIONAL CIVIL AVIATION ORGANIZATION-5-CMGZRHYJ, Ticket Cerrado, Ticket del Cliente:

Estimado Oliver,

En el mail que copio más abajo, Level 3 informa que el servicio fue restaurado (Asunto: Level (3) Ticket #: 13041733), y quiero confirmar que eso **no es cierto**, seguimos sin enlace en Manaus.

Estas son las cuestiones que no se entienden.

Y en el portal, la parte de tickets ahora no está disponible.





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Satelital

De: <[smc@level3.com](mailto:smc@level3.com)>

Fecha: 13 de julio de 2017, 9:21

Asunto: Level (3) Ticket #: 13041733, INTERNATIONAL CIVIL AVIATION ORGANIZATION-5-CMGZRHYJ, Ticket Cerrado, Ticket del Cliente:

Para: Level 3

Con respecto al Ticket 13041733, los servicios han sido restaurados y se encuentran en completo funcionamiento.

Nombre del Cliente: INTERNATIONAL CIVIL AVIATION ORGANIZATION

Número de la Cuenta de Facturación: 5-CMGZRHYJ

Ticket del Cliente:

Identificador del Servicio: 1-4IFJ6B

**Ticket Creado en: 1-4IFJ6B**

Producto: IP VPN

Ancho de banda: FE

Síntoma: Línea o circuito bajo

Ticket Abierto: 2017-07-13 12:40 GMT

Ticket Cerrado: 2017-07-13 13:21 GMT

**Ubicación A Nombre: OACI - BRASIL MANAUS**

Ubicación A Dirección: 1350 AVENIDA DO TURISMO, PONTE NEGRA, UNKNOWN Brazil

Ticket Abierto A Loc: 2017-07-13 08:40 AMT

Ticket Cerrado A Loc: 2017-07-13 09:21 AMT

Ubicación Z Nombre:

Ubicación Z Dirección:

Ticket Abierto Z Loc:

Ticket Cerrado Z Loc:

Área de Reparación: Ticket Duplicado

Acciones tomadas para la Reparación: Creado Manualmente

Resumen de la Reparación:

The ticket 13041009/2017 is still open and we are also analyzing the circuit issue through it.

This ticket will be closed as duplicated ticket.

Your telephone number and email address will be added on the ticket 13041009/2017 to keep you update.

Histórico de Notas:

07/13/2017 13:20:21 GMT - The ticket 13041009/2017 is still open and we are also analyzing the circuit issue through it.

This ticket will be closed as duplicated ticket.



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Your telephone number and email address will be added on the ticket 13041009/2017 to keep you update.

07/13/2017 12:41:01 GMT - se abrió un ticket a las 6:40hs local del día 13/07/2017 nro 13041009/2017 y no se registra en tickets abierto. Al momento sigue fuera de servicio

Hola Oliver,

el ticket que más abajo te copio, yo no lo generé.

Y la dirección es incorrecta. El aeropuerto de Ezeiza no está en calle Corrientes.

El 9 de agosto de 2017, 11:17, <[smc@level3.com](mailto:smc@level3.com)> escribió:

Level 3

Este email es una confirmación de que Level 3 ha creado el Ticket 13181202, sobre su servicio

Nombre del Cliente: INTERNATIONAL CIVIL AVIATION ORGANIZATION

Ubicación: OACI - ARGENTINA

Número de la Cuenta de Facturación: 5-CMGZRHYJ

Ticket del Cliente:

Identificador del Servicio: 1-4IFEP9

Ticket Creado en: 1-4IFEP9

Producto: IP VPN

Ancho de banda: FE

Síntoma: Línea o circuito bajo

Ticket Abierto: 2017-08-09 16:17 GMT

Ubicación A Nombre: OACI - ARGENTINA

Ubicación A Dirección: CALLE CORRIENTES, AEROPUERTO INTERNACIONAL EZEIZA, AR-C ARGENTINA

Ticket Abierto A Loc: 2017-08-09 13:17 ART

Ubicación Z Nombre:

Ubicación Z Dirección:

Ticket Abierto Z Loc:

.....  
24 de julio

Hola Javier,

Se ha detectado un problema en la última milla la cual es brindado por otro proveedor. Este caso ya ha derivado, escalado y estamos a la espera.

Hola Miguel,

Según lo conversado, te pido que nos brindes algún update sobre el avance del caso, ya sea por este medio o por el sistema de tickets.

Saludos,  
**Oliver Quiñones**



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## ANEXO DELTA (TICKETS EJEMPLO)

On Sat, Aug 26, 2017 at 6:51 PM -0500, "Javier Vittor"  
<[jvittor@icao.int](mailto:jvittor@icao.int)<<mailto:jvittor@icao.int>>> wrote:

Estimada Gloria,

la matriz de contactos fué modificada y los números y personas que Ud quiere contactar son erróneos.

Por favor, consulte y revise la matriz de contactos.

Asumo su reporte como inválido (y poco serio) y recuerdo que se están afectando servicios de tránsito aéreo.

No entiendo para qué trabajamos en corregir estas cuestiones y Uds. muestran esta imagen.

Descarte problemas de energía en el local, es un centro neurálgico de telecomunicaciones y tiene SAI si fuera el caso.

Por favor Gloria, comuníquese al tel. +55 92 3652-5713 como figura en la matriz actualizada de contactos.

Y por favor, solucionen la novedad a la brevedad, ya que esta situación es reiterativa.

---

From: [smc@level3.com](mailto:smc@level3.com) [[smc@level3.com](mailto:smc@level3.com)]

Sent: Saturday, August 26, 2017 6:45 PM

Subject: Level (3) Ticket #: 13270309, INTERNATIONAL CIVIL AVIATION ORGANIZATION-5-CMGZRHYJ, Ticket Actualización, Ticket del Cliente:

Level 3

Esto es una confirmación de Level 3 de que se ha registrado una actualización para el Ticket 13270309

Estimado Cliente, Buen día!

Con respecto al Ticket de Problema abierto para la sede en mención se informa lo siguiente. Se realiza marcación al teléfono < (55 21) 2101-6230/ +55 92 3652-5470/+55 92 8212-6374> pero no se logra establecer comunicación, no se ha podido realizar la respectiva verificación de los equipos (señalización, conexiones físicas), ni descartar falla de energía. Continuaremos con el seguimiento del caso.

En caso de poder confirmar estado de los equipos llamar a Network Management a los teléfonos: Col. 018000117997, Arg. 08008005388 Ecu. 01800400404 - Per. 5117004266 - Ven. 582122049306 - USA 1-800-467-7288, 018003666662

Gracias por su atención.

GLORIA STELLA LINARES PEREZ

Network Management Monitoring Engineer - Level 3

La próxima actualización en: Ninguno planeado en este momento



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Satelital

Nombre del Cliente: INTERNATIONAL CIVIL AVIATION ORGANIZATION Número de la Cuenta  
de Facturación: 5-CMGZRHYJ Ticket del Cliente:

Identificador del Servicio: 1-4IFJ6B

Ticket Creado en: 1-4IFJ6B

Producto: IP VPN

Ancho de banda: FE

Síntoma: Línea o circuito bajo

Ticket Abierto: 2017-08-26 22:07 GMT

Ubicación A Nombre: OACI - BRASIL MANAUS

Ubicación A Dirección: 1350 AVENIDA DO TURISMO, PONTE NEGRA, UNKNOWN Brazil Ticket

Abierto A Loc: 2017-08-26 18:07 AMT Ubicación Z Nombre:

Ubicación Z Dirección:

Ticket Abierto Z Loc:

Histórico de Notas:

08/26/2017 22:45:39 GMT - Estimado Cliente, Buen día!

Con respecto al Ticket de Problema abierto para la sede en mención se informa lo siguiente. Se realiza marcación al teléfono < (55 21) 2101-6230/ +55 92 3652-5470/+55 92 8212-6374> pero no se logra establecer comunicación, no se ha podido realizar la respectiva verificación de los equipos (señalización, conexiones físicas), ni descartar falla de energía. Continuaremos con el seguimiento del caso.

En caso de poder confirmar estado de los equipos llamar a Network Management a los teléfonos: Col. 018000117997, Arg. 08008005388 Ecu. 01800400404 - Per. 5117004266 - Ven. 582122049306 - USA 1-800-467-7288, 018003666662

Gracias por su atención.

GLORIA STELLA LINARES PEREZ

Network Management Monitoring Engineer - Level 3

08/26/2017 22:09:27 GMT - Apreciados señores, cordial saludo;

Se notifica la generación del ticket de problema para registrar el evento detectado por nuestros procesos de gestión proactiva. Se inicia la gestión para identificar causas y dar solución al evento. Los avances serán notificados oportunamente.

SEDE AFECTADA OACI - BRASIL MANAUS

TIPO DE EVENTO: caída

TIPO DE CANAL: PRINCIPAL

Cordialmente.

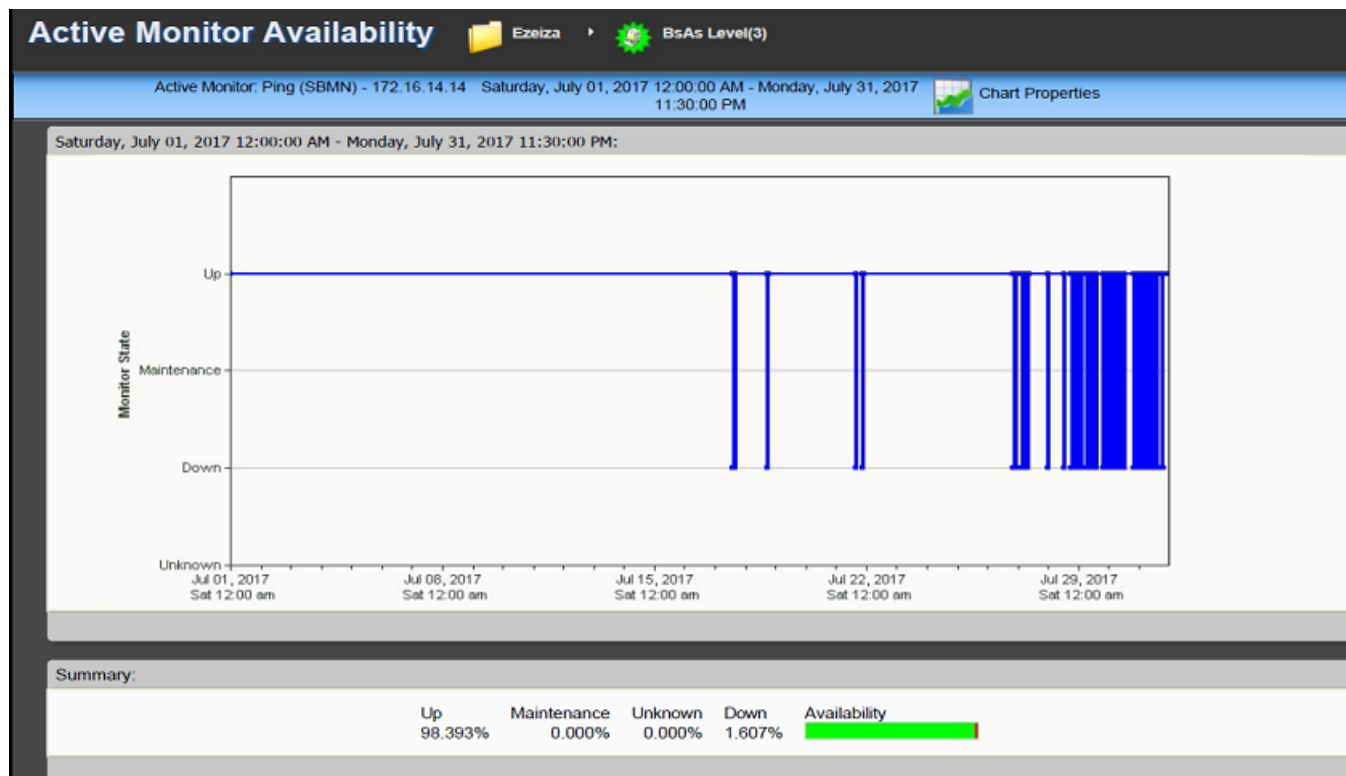
GLORIA STELLA LINARES PEREZ

Network Management Monitoring Engineer - Level 3

**ANEXO ECO****Ejemplo para obtener indisponibilidad mensual aplicando factor de corrección.**

La indisponibilidad mensual de un nodo, para este caso es Manaos y el mes es julio, se obtiene de la siguiente manera:

Utilizando las posibilidades que brinda el WUG como herramienta, la indisponibilidad mensual se obtiene tomando como referencia una estación que no tuvo inconvenientes con Level 3 o que tiene una indisponibilidad óptima. Para el caso se hacen las lecturas desde Ezeiza vs Manaos, como se aprecia en la siguiente captura:



A este porcentaje obtenido de 98.393 % se le suma un factor de error de 0.26%, dando como resultado 98.65%. Se lo compara con lo ofrecido, 99.50% para este caso. Y la diferencia de 0.85% se la multiplica por el MRC que para el caso es de 1500 UsD.

Esto nos da un valor de 12.71 UsD.

CIRCUITS	Measured	Offered	Difference	MRC USD	Credit USD
SBMN	98.65%	99.50%	0.85%	1.500.00	12.71

Este es el método que se viene aplicando desde el año 2016 y fue acordado con Level 3 en función de entender que es el que más se ajusta y es más preciso para obtener indisponibilidades.

En este caso, el Whats Up Gold es muy importante como herramienta.

APÉNDICE G / APPENDIX G


RCC/21 – NE/03-WP/03

Level3\_Unavailability Credits\_2017

	January 2017		February 2017		March 2017		April 2017		May 2017		June 2017		July 2017		August 2017		September 2017		October 2017		November 2017		December 2017		TOTAL		
	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	Availability	USD Credit	USD Credit		
SAEZ																										-	
SBBR	97.39%	27.74			93.59	73.32																				101.06	
SBCT			92.83%	57.05																					98.99 %	5.93	62.98
SBMN	88.24%	168.87	79.89%	294.14	85.28	213.36	73.02%	397.20	75.31%	362.91	79.43%	301.11	98.65%	12.71	91.81%	115.32	95.18%	64.77	98.81 %	10.42	93.64 %	87.98	98.57 %	13.96	2042.75		
SBRF	98.69%	10.59	98.78%	9.64			92.26%	78.12			98.88%	8.58			99.55%	1.54					97.88 %	19.11	98.74 %	10.09	137.67		
SCEL																										-	
SEGU																										-	
SGAS									99.60%	1.84							95.47%	76.14	88.00 %	210.67				92.68 %	126.34	414.99	
SKED																										-	
SLLP																										-	
SMPM													81.27%	403.60												403.60	
SOCA																	99.23%	25.33	99.68 %	1.35						26.68	
SPIM			91.71%	66.32					98.23%	12.22	98.60%	9.15														87.69	
SUMU																									98.87 %	14.98	14.98
SVMI	99.58%	2.54	98.39%	28.80	96.60	67.85			98.39%	28.73	92.61%	155.23			90.31%	205.73	95.70%	87.56			87.02 %	277.74	99.12 %	12.75	866.93		
SYGC											99.57%	4.85					99.68%	0.92			99.68 %	0.85				6.62	
TTZP			98.14%	24.46	98.87	11.36																			91.54 %	143.24	179.06

Note: SLA-Availability for all nodes: 99.70%  
 Except for SBMN and TTZP : 99.50%

TOTAL USD 4345.01

				Contactos					Cliente	OACI	
Network Management DATA PRODUCTS				Servicios Gerenciados					Fecha	14 de agosto de 2017	
									Versión	1.0	
									Responsable	Level 3	
<b>Leyenda</b>				<b>SEDES CRITICAS</b>							
Sitio				Indicar el sitio del contacto			e-mail	E-mail del Contato			
Contacto				Colocar el nombre del contacto			Disponibilidad	Horario Especial o 24 horas (horario en GTM)			
Tipo				Indicar la categoría en que se encaja el contacto			Escalamiento	Prioridad de Escalamiento			
Teléfono 1 y 2				Colocar los teléfonos del contacto			Orden	Secuencia de contacto en caso de emergencia			
Sitio	Nombre Nodo	Indicador Aeronáutico	Dirección Física	Contacto	Tipo	Teléfono 1	Teléfono 2	e-mail	Disponibilidad	Escalamiento	Orden
BRASIL-MANAUS	MANAUS	SBMN	CINDACTA IV Av. do Turismo 1350, Tarumã - CEP 69045-630 Manaus, AM	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a>	24 Horas	1	1
				Javier Vittor	Técnico	55-92-3652 5714	55-92-991775414	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	2	2
ARGENTINA	EZEIZA	SAEZ	Aeropuerto Ministro Pistarini (Ezeiza) 4to Piso - CECODI	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a>	24 Horas	1	1
				Centro de Gestión	Técnico	54-11-4480 2362	54-11-4480 2363	<a href="mailto:hcanna@eana.com.ar">hcanna@eana.com.ar</a>	24 Horas	2	2
				Hernán Canna	Técnico	54-11-4480 2350	54-11-4480 2357	<a href="mailto:hcanna@eana.com.ar">hcanna@eana.com.ar</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
BRASIL-RECIFE	RECIFE	SBBRF	CINDACTA III Av Centenario Santos Dumont s/n, Ibura - CEP 51250-020 Recife, PE	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	55-81-2129 8376	55-81-2129 8116	<a href="mailto:carlosetpaes@gmail.com">carlosetpaes@gmail.com</a>	24 Horas	2	2
				Carlos Paes	Técnico	55-81-2129 8180	55-81-997001049	<a href="mailto:carlosetpaes@gmail.com">carlosetpaes@gmail.com</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
BRASIL-CURITIBA	CURITIBA	SBCT	CINDACTA II Av Erasto Gaertner 1000, CEP 82515-000 Curitiba, PR	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	55-41 3251 5315	55-41 3251 5416	<a href="mailto:jeffersonjmc@cindacta2.gov.br">jeffersonjmc@cindacta2.gov.br</a>	24 Horas	2	2
				Jefferson Cheron	Técnico	55-41 3251 5278	55-41-99255 9495	<a href="mailto:jeffersonjmc@cindacta2.gov.br">jeffersonjmc@cindacta2.gov.br</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
				Emerson Zuckert	Técnico	55-41 3251 5705	55-41-99255 9495	<a href="mailto:zuckertezn@cindacta2.gov.br">zuckertezn@cindacta2.gov.br</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	4	4
BRASIL-BRASILIA	BRASILIA	SBBR	CINDACTA I - SHIS QI 05 - Área Especial 12 - Lago Sul - CEP: 71615-600 - Brasília-DF - Brasil	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a>	24 Horas	1	1
				Centro de Gestión Brasilia	Técnico	(61) 3364-8474	(61) 3364-8517	<a href="mailto:maiatmm@cindacta1.aer.mil.br">maiatmm@cindacta1.aer.mil.br</a>	24 Horas	2	2
				Ten Rodolfo/ 3S Maia	Técnico	(61) 3364-8511	(61) 3364-8532	<a href="mailto:maiatmm@fab.mil.br">maiatmm@fab.mil.br</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
PERU	LIMA	SPIM	Aeropuerto Internacional Jorge Chávez, Av. Elmer Faucett s/n, Callao	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	51-1-5153015	51-1-4141250	<a href="mailto:reddiag@corpac.gob.pe">reddiag@corpac.gob.pe</a>	24 Horas	2	2
				Luis Silva	Técnico	51-1-4141250		<a href="mailto:lsilva@corpac.gob.pe">lsilva@corpac.gob.pe</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3

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TRINIDAD & TOBAGO	PIARCO	TTZP	Trinidad and Tobago Civil Aviation Authority Complex, Caroni North Bank Road, Piarco	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvittor@icao.int">jvittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	1-868 6691859	1-868-6694706	<a href="mailto:sgoupaul@caa.gov.tt">sgoupaul@caa.gov.tt</a>	24 Horas	2	2
				Andrew Ramikissoo	Técnico	1-868-774-4234		<a href="mailto:aramkissoo@caa.gov.tt">aramkissoo@caa.gov.tt</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
				Shiraz Gopaul	Técnico	1-868-4679717		<a href="mailto:sgoupaul@caa.gov.tt">sgoupaul@caa.gov.tt</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	4	4
				Rupnarine Baboolal	Técnico	868-774-4249		<a href="mailto:rbaboolal@caa.gov.tt">rbaboolal@caa.gov.tt</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	5	5
ECUADOR	GUAYAQUIL	SEGU	Aeropuerto José Joaquín de Olmedo, Edificio Servicio para la Navegación Aérea, Av de las Américas - Guayaquil	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvittor@icao.int">jvittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	5934 2287236	5934 2692829	<a href="mailto:raul.avellan@aviacioncivil.gob.ec">raul.avellan@aviacioncivil.gob.ec</a>	24 Horas	2	2
				Raúl Avellán	Técnico	5932-2947463 ext 2197	593-967118552	<a href="mailto:raul.avellan@aviacioncivil.gob.ec">raul.avellan@aviacioncivil.gob.ec</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
				Washington Quinde	Técnico	5932-2947463 ext 2141	593-988448196	<a href="mailto:washington.quinde@aviacioncivil.gob.ec">washington.quinde@aviacioncivil.gob.ec</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	4	4
				Maria Fernanda Rodríguez	Técnico	5932-2947463 ext 2141	593-959149526	<a href="mailto:maria.rodriguez@aviacioncivil.gob.ec">maria.rodriguez@aviacioncivil.gob.ec</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	5	5
COLOMBIA	BOGOTÁ	SKED	Aeropuerto Internacional El Dorado, Av El Dorado No. 112-09 Edificio C.N.A. - Bogotá	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvittor@icao.int">jvittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	571 2962272	571 2962062	<a href="mailto:luis.lozanos@aerocivil.gov.co">luis.lozanos@aerocivil.gov.co</a>	24 Horas	2	2
				Gabriel Guzmán	Técnico	571 2962940	57 317 6567202	<a href="mailto:gabriel.guzman@aerocivil.gov.co">gabriel.guzman@aerocivil.gov.co</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
CHILE	SANTIAGO	SCEL	Av. San Pablo 8411, Comuna de Pudahuel - Santiago	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvittor@icao.int">jvittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	5624 8364007	5622 8364005	<a href="mailto:cvergara@dgac.gob.cl">cvergara@dgac.gob.cl</a>	24 Horas	2	2
				Christian Vergara	Técnico	5622 8364005	5622 6448345	<a href="mailto:cvergara@dgac.gob.cl">cvergara@dgac.gob.cl</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
				Pedro Pastrian	Técnico	5623 8364011	5624 8364007	<a href="mailto:ppastrian@dgac.gob.cl">ppastrian@dgac.gob.cl</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	4	4
URUGUAY	MONTEVIDEO	SUMU	Aeropuerto Internacional de Carrasco, Av. Wilson Ferreira Aldunate 253, Paso Carrasco, Canelones	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvittor@icao.int">jvittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	5982 6010932 int 4520	5982 6040408	<a href="mailto:wilsonpelayo62@gmail.com">wilsonpelayo62@gmail.com</a>	24 Horas	2	2
				Miguel Vera	Técnico	5982 6040408 int 4517	5982 6040408	<a href="mailto:miguelvera@vera.com.uy">miguelvera@vera.com.uy</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
PARAGUAY	ASUNCIÓN	SGAS	Centro de Control Unificado, Gral. Artigas y Fernando de Mompox, Mariano Roque Alonso	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:jvittor@icao.int">jvittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	595 21 7585208	595 21 7585201	<a href="mailto:aldopereira28@gmail.com">aldopereira28@gmail.com</a>	24 Horas	2	2
				Victor Morán	Técnico	595 9 217585017	595 9 81355487	<a href="mailto:moranchu@gmail.com">moranchu@gmail.com</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
				Ronald Benítez	Técnico	595 21 7585208		<a href="mailto:ronaldbenitez1907@gmail.com">ronaldbenitez1907@gmail.com</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	4	4

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GUYANA	GEORGETOWN	SYGC	Control Tower Complex, Cheddi Jagan Int'l Airport, Timeri, East Bank Demerara	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:ivittor@icao.int">ivittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	592 261 2569	592 261 2279	<a href="mailto:sewchan_hemchan@yahoo.com">sewchan_hemchan@yahoo.com</a>	24 Horas	2	2
				Mortimer Salisbury	Técnico	592 261 2569		<a href="mailto:mbsalisbur2000@yahoo.com">mbsalisbur2000@yahoo.com</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
GUYANA FRANCESA	CAYENA	SOCA	Aviation Civile, Aeroport de Rochambeau, 97351 Matoury	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:ivittor@icao.int">ivittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	594 594 359317	594 594 359321	<a href="mailto:cayenne.ttd@aviation-civile.gouv.fr">cayenne.ttd@aviation-civile.gouv.fr</a>	24 Horas	2	2
				Alain Burtin	Técnico	594 594 359317		<a href="mailto:alain.burtin@aviation-civile.gouv.fr">alain.burtin@aviation-civile.gouv.fr</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
VENEZUELA	MAIQUETÍA	SVMÍ	Edificio ATC, 2do Piso, Dpto. Comunicaciones, Maiquetía, Edo. Vargas	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:ivittor@icao.int">ivittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	58212 3552143	58212 3551412	<a href="mailto:l.escobar@inac.gob.ve">l.escobar@inac.gob.ve</a>	24 Horas	2	2
				Vicente Fiore	Técnico	58212 3552143	58212 3551412	<a href="mailto:v.fiore@inac.gob.ve">v.fiore@inac.gob.ve</a>	Horario Comercial	3	3
SURINAME	PARAMARIBO	SMPM	J.A. Pengel International Airport, Zanderij, District Para	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:ivittor@icao.int">ivittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	597 325123	597 325176	<a href="mailto:mickiano@live.com">mickiano@live.com</a>	24 Horas	2	2
				Mitchell Themen	Técnico	597 497143	597 531288	<a href="mailto:mickiano@live.com">mickiano@live.com</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3
BOLIVIA	LA PAZ	SLLP	Aeropuerto Internacional El Alto, Bloque Técnico AASANA	Centro de Gestión Manaus	Técnico	55-92-3652 5713	55-92-3652 5712	<a href="mailto:ivittor@icao.int">ivittor@icao.int</a>	24 Horas	1	1
				Sala Técnica	Técnico	5912 212 9901		<a href="mailto:herman_tto@yahoo.es">herman_tto@yahoo.es</a>	24 Horas	2	2
				Remigio Blanco	Técnico	5912 2370340		<a href="mailto:rblanco@aaasana.bo">rblanco@aaasana.bo</a>	Horario Especial (De lunes a viernes desde las 12:00 utc - 20:00 utc)	3	3

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Sitio	Nombre Nodo	Indicador Aeronáutico	e-mail
BRASIL-MANAUS	MANAUS	SBMN	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:ttst@cindacta4.decea.gov.br">ttst@cindacta4.decea.gov.br</a> <a href="mailto:eraldodmenezes@gmail.com">eraldodmenezes@gmail.com</a>
ARGENTINA	EZEIZA	SAEZ	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:hcanna@eana.com.ar">hcanna@eana.com.ar</a>
BRASIL-RECIFE	RECIFE	SBBRF	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:carlofefpaes@gmail.com">carlofefpaes@gmail.com</a>
BRASIL-CURITIBA	CURITIBA	SBCT	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:jeffersonjmc@cindacta2.gov.br">jeffersonjmc@cindacta2.gov.br</a>
BRASIL-BRASILIA	BRASILIA	SBBR	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:rodolforbs1@fab.mil.br">rodolforbs1@fab.mil.br</a>
PERU	LIMA	SPIM	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:reddig@corpac.gob.pe">reddig@corpac.gob.pe</a>
TRINIDAD & TOBAGO	PIARCO	TTZP	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:sgoupaul@caa.gov.tt">sgoupaul@caa.gov.tt</a>
ECUADOR	GUAYAQUIL	SEGU	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:raul.avellan@aviacioncivil.gob.ec">raul.avellan@aviacioncivil.gob.ec</a> <a href="mailto:washington.quinde@aviacioncivil.gob.ec">washington.quinde@aviacioncivil.gob.ec</a>
COLOMBIA	BOGOTÁ	SKED	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:luis.lozanos@aerocivil.gov.co">luis.lozanos@aerocivil.gov.co</a> <a href="mailto:gabriel.guzman@aerocivil.gov.co">gabriel.guzman@aerocivil.gov.co</a>
CHILE	SANTIAGO	SCEL	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:cvergara@dgac.gob.cl">cvergara@dgac.gob.cl</a> <a href="mailto:ppastrian@dgac.gob.cl">ppastrian@dgac.gob.cl</a>
URUGUAY	MONTEVIDEO	SUMU	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:wilsonpelayo62@gmail.com">wilsonpelayo62@gmail.com</a> <a href="mailto:miguelvera@vera.com.uy">miguelvera@vera.com.uy</a>
PARAGUAY	ASUNCIÓN	SGAS	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:moranchu@gmail.com">moranchu@gmail.com</a> <a href="mailto:ronaldbenitez1907@gmail.com">ronaldbenitez1907@gmail.com</a>

GUYANA	GEORGETOWN	SYGC	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:mbsalisbury2000@yahoo.com">mbsalisbury2000@yahoo.com</a>
GUYANA FRANCESA	CAYENA	SOCA	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:cayenne.td@aviation-civile.gouv.fr">cayenne.td@aviation-civile.gouv.fr</a> <a href="mailto:alain.burtin@aviation-civile.gouv.fr">alain.burtin@aviation-civile.gouv.fr</a>
VENEZUELA	MAIQUETÍA	SVMI	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:l.escobar@inac.gob.ve">l.escobar@inac.gob.ve</a> <a href="mailto:v.fiore@inac.gob.ve">v.fiore@inac.gob.ve</a>
SURINAME	PARAMARIBO	SMPM	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:mickiano@live.com">mickiano@live.com</a>
BOLIVIA	LA PAZ	SLLP	<a href="mailto:jvitor@icao.int">jvitor@icao.int</a> <a href="mailto:rblanco@aaasana.bo">rblanco@aaasana.bo</a> <a href="mailto:hernan_tito@yahoo.es">hernan_tito@yahoo.es</a>

CONTACTOS DE SOPORTE LEVEL 3						
Orden	Contacto	Tipo	Teléfono 1	Teléfono 2	e-mail	Tiempo Transcurrido
1	NMOC (7x24)	Monitoring Engineer	0 800 7 0862	57-1-611-8226	<a href="mailto:servicedesknmes@level3.com">servicedesknmes@level3.com</a>	
2	Miguel Andres Prada	Service Desk Coordinator	57-316-3319119	57-1-6119471	<a href="mailto:Miguel.Prada@level3.com">Miguel.Prada@level3.com</a>	1 hora
3	Luis David Diaz	Service Desk NM Manager	57-315-3081496	57-1-6119065	<a href="mailto:Luis.Diaz@Level3.com">Luis.Diaz@Level3.com</a>	2 horas
4	Durval Carvalho	Customer Assurance & Network VP	55-11-99603-4834	55 11 3957-2213	<a href="mailto:durval.carvalho@level3.com">durval.carvalho@level3.com</a>	4 horas
	Jorge Nano	Executive account	511-705-5655	51-985855655		
	Rudy Garcia	Service Manager	511-705-5623	51-954135146		

Manaus Brazil  
30 January 2018

## FNAT ATTACHMENT COMMENTARIES

The Provisional Site Acceptance Tests, (Document PSAT – NAT - NT 2022-2141167C rev H) were made from 31 January to 5 February 2015. Once the tests were concluded, the focal points of the REDDIG II States members proceeded to sign the PSAT certificate with comments in each of the nodes.

The results of the PSAT tests in each of the nodes were registered by the focal points in the PSAT document (H version). In the web page [www1.lima.icao.int/reddig](http://www1.lima.icao.int/reddig) are published the PSAT documents completed by the focal points.

According to the article 13.1 of the REDDIG II Contract No. 2250120 established between the International Civil Aviation Organization and the consortium consisting of INEO Engineering and Systems and LEVEL 3 PERÚ S.A, for the Provision of a New Regional Aeronautical Telecommunication Network (REDDIG II) and associated equipment and services, the rectification of Network deficiencies evidenced at PSAT would had to be completed in the period of forty (40) ORD days after the PSAT

The majorities of the pending issues identified in the REDDIG II during the PSAT were solved during the first semester of 2015 with the exception of following major failures:

*Random freezing at some of the satellite modems (SkywanID 1070) REDDIG II nodes*

*Random freezing at the Manaus modem A (Skywan ID 7000)*

Random freezing at some of the satellite modems (SkywanID1070) REDDIG II nodes

With respect to this failure, INEO reported at the end of 2016 that it was due to a synchronization problem between the RXRF part and the Skyway modems, and to fix the problem, requires replacing all existing LBNs (which presently generate internally their own 10MHz reference frequency) by new LBNs (receiving an external 10MHz reference frequency coming from the Skyway).

The replacement of the LBNs started on the month of February 2016 and was completed at the beginning of April 2017. The replacement was made during the following schedule date:

Manaus	11 <sup>th</sup> February 2016
Recife	17 <sup>th</sup> February 2016
Lima	15 <sup>th</sup> April 2016
Cayenne	6 <sup>th</sup> June 2016
Ezeiza	17 <sup>th</sup> June 2016
Guayaquil	8 <sup>th</sup> July 2016
Brasilia	9 <sup>th</sup> January 2017
Curitiba	11 <sup>th</sup> January 2017
Piarco	6 <sup>th</sup> February 2017
Paramaribo	9 <sup>th</sup> February 2017
Georgetown	13 <sup>th</sup> February 2017
Maiquetia	16 <sup>th</sup> February 2017
Bogota	19 <sup>th</sup> February 2017

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La Paz	29 <sup>th</sup> March 2017
Santiago	5 <sup>th</sup> April 2017
Asuncion	30 <sup>th</sup> March 2017
Montevideo	9 <sup>th</sup> April 2017

Random freezing at the Manaus modem A (Skywan ID 7000)

The Skywan MODEM of Manaus is the most important equipment of the satellite REDDIG II subnetwork because it controls all the rest of the MODEMs of REDDIGII network. There is only one master in Manaus and one backup master in Ezeiza, in both sites, identified as Skywan "A".

Even though INEO took the necessary actions to install externally referenced LNBS and 10 MHz redundancy kits (February 2016) the problem persisted in Manaus.

On May 19 2017 INEO with ND SATCOM (Skywan modem manufacturer) made the "upgrade" of the Skywan satellite system to a new firmware version. Despite this upgrade, the problem of freezing of the Manaus Skywan master continued. This default occurred every eight (8) to ten (10) days. This condition forced to restart the said equipment to normalize its operation.

The freezing of the Skywan Master in Manaus has been taking place, including replacing the equipment serial 7000 with a similar one that was in the Lima Regional Office as spare part.

ND Satcom developed a specific debug software, which was implemented in the REDDIG II in October 2017. This later showed evidence of an overload of TCP sockets opened, root of the issue (the quantity of TCP socket is limited and got to overflow, resulting in freezing the device). Following this evidence was discovered a wrong configuration between the NMS What's Up Gold and the Skywan Modem A, and proceeded to be fixed.

The last occurrence of freezing in the Manaus Skywan MODEM A was the 19<sup>th</sup> November 2017 and since now no additional freezing occurred.

## **FNAT PROCEDURE**

Considering that the major REDDIG II pending issues were solved as described above, the FNAT procedure has been made from 29 January to 30 January 2018 in Manaus Brazil in the installation of CINDACTA IV where is hosted the REDDIG II node and the main Network Control Center (NCC).

During the FNAT it was reviewed the functioning of the NCC, the configuration of the satellite MODEM Skywan A 7000 and the NMS (Network Management System). Additionally it was reviewed the status of functioning of all the nodes of REDDIG II.

It was verified that the action made by INEO solved the REDDIG major problem that originated the delay of the FNAT and proceeded to sign the FNAT certificate the 30 January 2018.

The FNAT process and certificate signature were made by the following representatives of INEO and ICAO:

For INEO :  
Thierry Su  
Clement Chevallier

For ICAO :  
Onofrio Smarrelli  
Cristian Javier Vittor

The FNAT was made only at the REDDIG II satellite sub network, due that the FNAT for the ground REDDIG II network was made in January 2016 and Amendment 4 for the REDDIG II Contract No. 2250120 was signed.

During the FNAT were considered the following action to be completed in the following time period by INEO in conjunction with REDDIG II Administration :

- a) Pending to reload the OSPF in the Manaus SKYWAY modems.
- b) Review of the cabling for IBUC monitoring in Manaus due to loss of packets
- c) Review the monitoring configuration of the IBUC and RX in the NETGEAR in Manaus

The technical representative of INEO Mr. Clement Chevallier will proceed to solve all the above pending issues in Manaus for the 2 February 2018.

The SKYWAN Modem in La Paz node presents problem in the main and standby equipment. In order to solve the problem Mr. Clement Chevallier an INEO Engineer will go to La Paz from 12 to 16 February 2018 with Mr. Cristian Javier Vittor the REDDIG II Administrator

Additional the following pending issues will be studied during this period and solved no later than the 28th February 2018:

CRC errors in the network generated from Bogota REDDIG II node  
Updating Manaus diagram installation

**Onofrio Smarrelli**

ICAO Lima Regional CNS Officer  
REDDIG II Manager Project

**Thierry SU**

Project Manager  
INEO ENERGY & SYSTEMS

**Cristian Javier Vittor**

REDDIG II Administrator

**Clement Chevallier**

Technical Manager  
INEO ENERGY & SYSTEMS

## FINAL NETWORK ACCEPTANCE TEST CERTIFICATE

**Reference:** International Civil Aviation Organization (ICAO)  
Contract: 22501200  
REDDIG II Network  
RLA/03/901 – REDDIG II Project Group

*We hereby acknowledge that the REDDIG II network and associated equipment (all sites) have been verified in accordance with mutually agreed upon test procedures and found to be compliant with the provisions of ICAO Contract 22501200.*

### On behalf of INEO Engineering and Systems / Level 3\*

THIERRY SU  
*Project Manager Authorized Representative*

 30.01.2018

Signature and Date

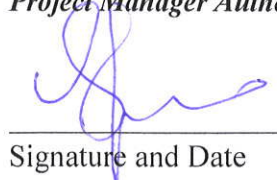
CLEMENT CHEVALLIER  
*Technical Manager Authorized Representative*

 30/01/2018

Signature and Date


### On behalf of the REDDIG II Project Group

ONOFRIO SMARRELLI  
*Project Manager Authorized Representative*

 30 January 2018

Signature and Date

CHRISTIAN JAVIER VITTOR  
*REDDIG II Administrator Authorized Representative*

 30-01-2018

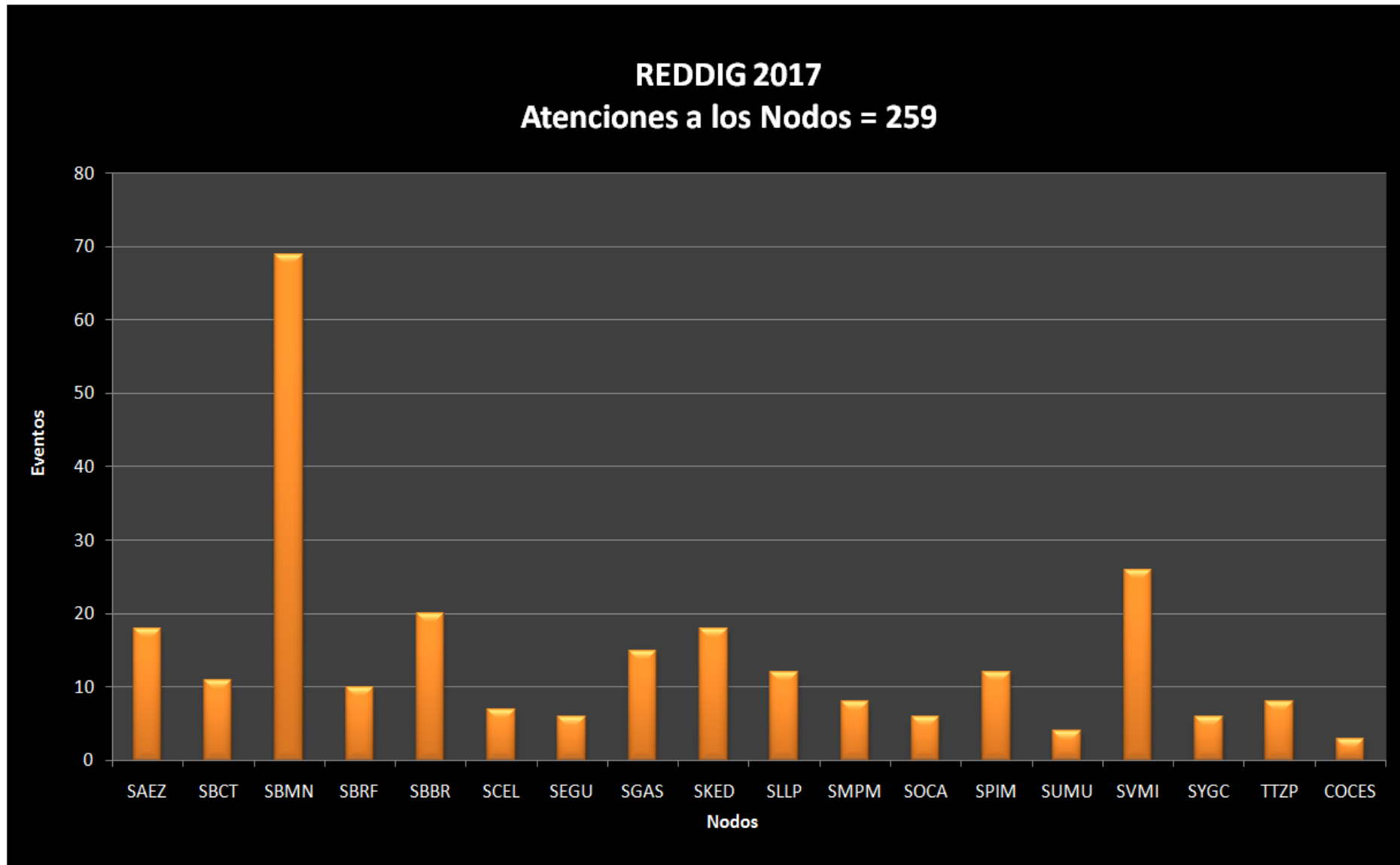
Signature and Date

**Note : FNAT commentaries are attached to this certificate.**

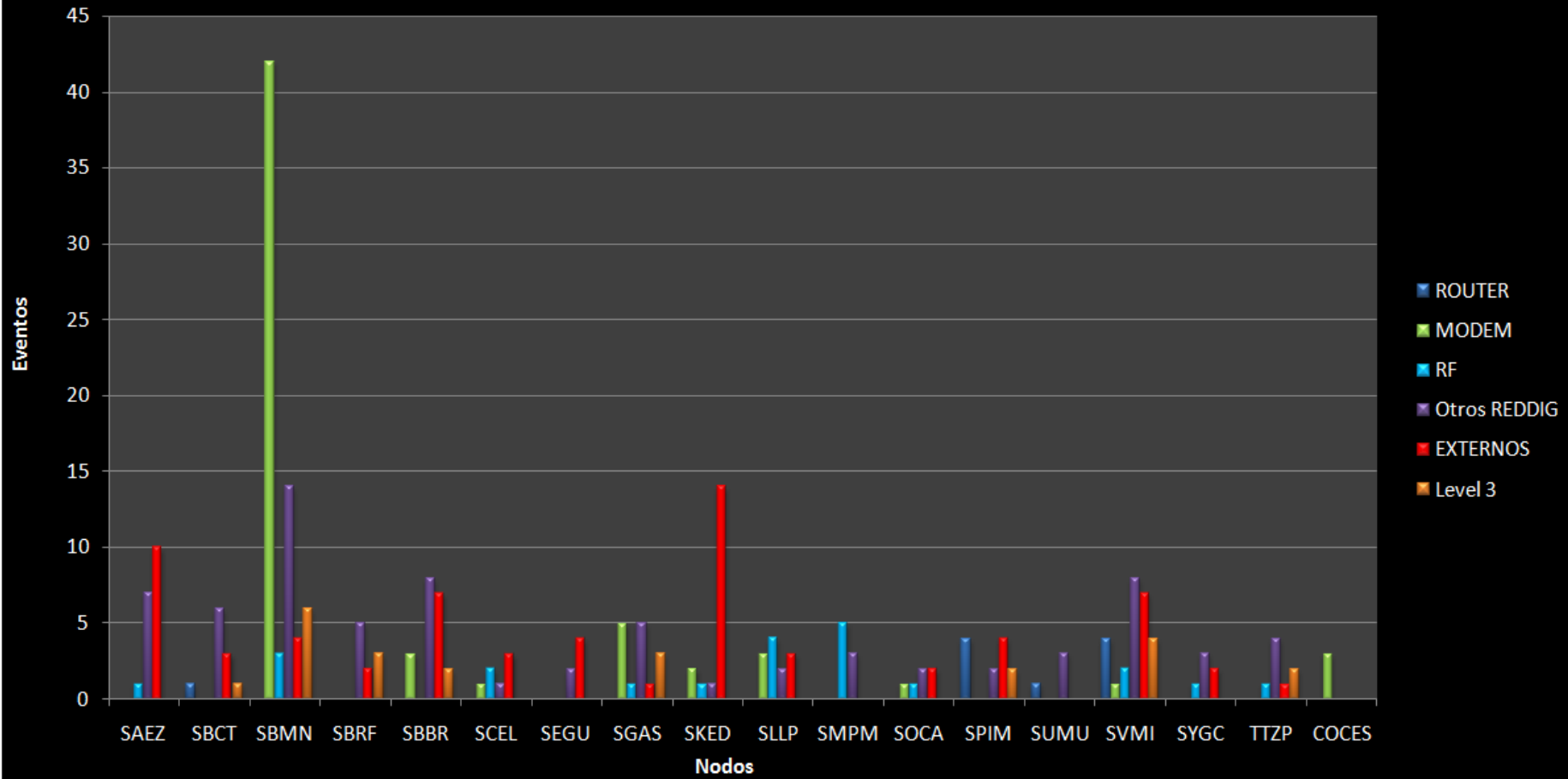
\* A separate FNAT certificate was signed with LEVEL 3 according to Amendment IV of the Contract.

**RESUMEN DE AVERÍAS Y PARTES – 2017**  
**LIST OF TROUBLESHOOTING AND SPARE PARTS – 2017**

<b>EVENTO</b>	<b>NODO</b>	<b>EQUIPO/PARTE</b>	<b>DOC EMBARQUE</b>	<b>ENVIO DE</b>	<b>HASTA</b>	<b>GASTOS ENVIO US\$</b>
<b>OR-17001</b>	SLLP	GPS Receiver	SAMRO-73	Lima RO	La Paz, Bolivia	p/ Bolivia (INEO)
<b>OR-17002</b>	SBBR	Netgear Switch	SAMRO-74	Lima RO	Brasilia, BR	p/ Brasil (INEO)
<b>OR-17003</b>	SLLP	SKW 1070	SAMRO-75	Lima RO	La Paz, Bolivia	p/Bolivia (INEO)
<b>OR-17004</b>	SAEZ	GPS Receiver	SAMRO-76	Lima RO	Ezeiza, Argentina	p/Argentina (INEO)
<b>OR-17005</b>	SMPM	IBUC 80W	SAMRO-77	Lima RO	Paramaribo, Sur	p/Surinam (INEO)



## REDDIG 2017 Distribución de atenciones



### REDDIG 2017

#### Distribución de atención por categoría de equipo

