Presentation of RPM system to MNOs (ARCT)

Tahitii OBIOHA

Radio Network Performance Engineer
Planet Network International, France

Agenda

1. RPM system & D.QoS Solutions Overview

2. ARCT Server Configuration

3. ARCT-MNO Connectivity

4. PM file (3GPP) collection

5. KPI Formula based on 3GPP Definition

6. CO-OP formula vs Vendor formula

7. Common Errors to avoid in submitting PM files

•Benin, Guinea, and Zimbabwe have already implemented the D-QoS application

•**Zimbabwe**

•**Ghana**

•**Eswatini**

•**Mozambique**

•**Rep. Dem Congo-Kinshasa**

•**Benin**

•**Senegal**

•**Sierra Leone**

•**Zambia**

•**Guinea - Conakry**

•**Burkina Faso**

•**Botswana**

•**Burundi** -2024

•RPM system [Regulators' (QoS) Performance Monitoring System]
The RPM System, designed for QoS performance monitoring by regulators, is an innovative NMS solution that ensures interconnection with all the network monitoring systems of operators and service providers.

• It collects performance data and generates KPI reports that measure a network's performance against the established benchmarks in ARCT QoS Guidelines.

•RPM system dedicated to regulators: Designed for QoS performance monitoring

•Innovative NMS solution: Advanced network management for regulators.

•Interconnection with monitoring systems: Integration passively with mobile operators' monitoring platforms.

•Data collection and aggregation: Calculation of KPIs according to ITU-T QoS evaluation categories with formulas defined by 3GPP and aggregation of these values from the cellular level to the level of municipalities, then provinces, up to the network level.

•Detailed KPI reports: Production of reports for network performance analysis.

•QoS Enforcement: Tool facilitating the enforcement of QoS standards down to the cellular level..

•Evaluation against the QoS Specifications: Comparison of network performances based on ITU-T QoS evaluation categories and established regulatory thresholds.
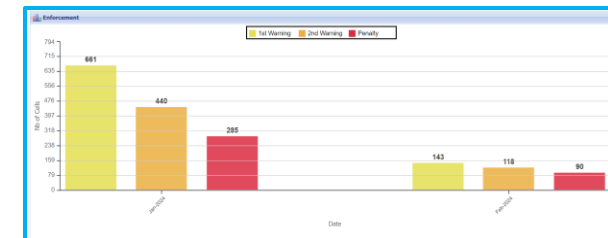
•The D.QoS mobile application (Delivered Quality of Service) acts as an enabling platform for **end-users**, providing them with valuable data on network performance and radio coverage.

•This information allows users to make informed decisions regarding the quality of telecommunication services available in their respective municipalities.

•The D-QoS application allows the ARCT to monitor network performance and improve customer experience in Burundi. It also facilitates the collection of user feedback, which is essential for informed regulatory decisions and the development of telecommunications in the country.

•Display of Radio Coverage: Visualisation de la couverture réseau par les utilisateurs.

•Access to QoS Delivered Data: Accès aux données sur la qualité de service fournie par les opérateurs de télécommunication.

•Reporting of Quality of Experience (QoE) : Detailed reports on user experience..

•Instant Notifications: Real-time alerts on network events.

•Survey Module (Crowdsourcing): User participation in the evaluation of network quality.

•Scalability : The application's ability to scale and adapt to a growing base of users and data.
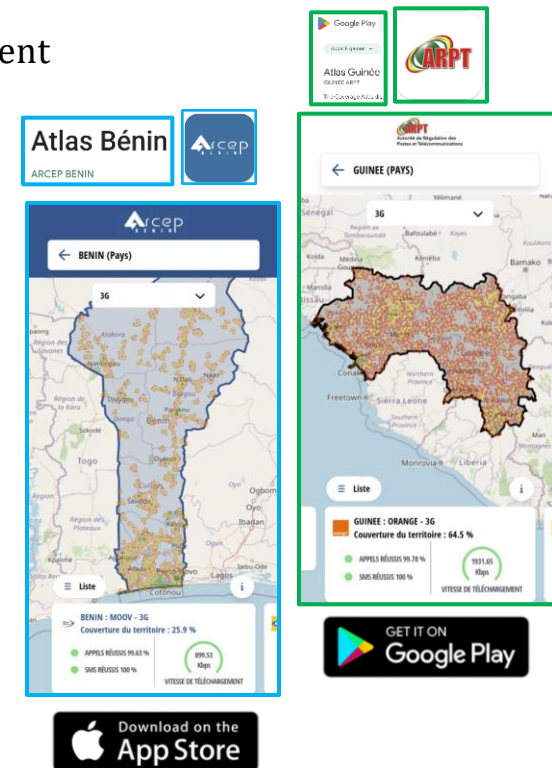
QoS Challenges have been addressed and solutions are given in recommendations as seen in **ITU-T E.800 Sup 9**, **ITU-T E.811** and **ETSI EG 202 057-3**.

Radio coverage propagation models and prediction methods are given in recommendations **ITU-R P.1411-12**, **ITU-R P.2147** and **ITU-R P.2108-1**

ITU-T

Series E
Supplement 9
(12/2013)

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

SERIES E: OVERALL NETWORK OPERATION, TELEPHONE SERVICE, SERVICE OPERATION AND HUMAN FACTORS

Supplement 9 to ITU-T E.800-series Recommendations (Guidelines on regulatory aspects of QoS)

ITU Publications
Recommendations

International Telecommunication Union
Radiocommunication Sector

Recommendation ITU-R P.1411-12
(08/2023)

P Series: Radiowave propagation

Propagation data and prediction methods for the planning of short-range outdoor radiocommunication systems and radio local area networks in the frequency range 300 MHz to 100 GHz

ITU-T

E.811
(03/2017)

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

SERIES E: OVERALL NETWORK OPERATION, TELEPHONE SERVICE, SERVICE OPERATION AND HUMAN FACTORS

Quality of telecommunication services: concepts, models, objectives and dependability planning – Models for telecommunication services

Quality measurement in major events

ETSI EG 202 057-3 V1.1.1 (2005-04)
ETSI Guide

Speech Processing, Transmission and Quality Aspects (STQ);
User related QoS parameter definitions and measurements;
Part 3: QoS parameters specific to Public Land Mobile Networks (PLMN)

ITU-R
Radiocommunication Sector of ITU

Recommendation ITU-R P.2147-0
(08/2022)

Acquisition, presentation, analysis and use of digital products in studies of radiowave propagation

P Series
Radiowave propagation

Recommendations discussing land cover

ITU-R P.	Applicability
1546	Antenna height corrections
452	Clutter losses
833	Attenuation in vegetation (especially trees)
1058	Terrain databases
1146	Antenna height corrections
1812	Vegetation and clutter losses
1238	Planning of indoor radiocommunication systems
2040	Effects of building materials and structures

ITU-R
Radiocommunication Sector of ITU

Recommendation ITU-R P.2108-1
(09/2021)

Prediction of clutter loss

P Series
Radiowave propagation

RPM System Overview

•**R**egulators' (QoS) **P**erformance **M**anagement System is **the novel NMS solution** that handles the task of interfacing all the operators'/service providers' network monitoring systems, collect perfomance data records and create KPI reports that renders a given network performance against published benchmarks.

RPM System™ in numbers

(typical configuration)

- Field track record   10 years
- Footprint (countries)   > 12
- Set-up time   3 months
- Auditing frequency   Daily

- Tracked KPIs   300+
- Alarm sensitivity   < 1 hour
- Report creation effort   < 10 min
- CDR volume   1+ M/day
- Compliance snap-shot   < 1 day

Typical RPM System™hardware configuration

Dell Server set-up		
PowerEdge 2420	24U rack enclosure	High air flow and modularity
PowerEdge R815	4-socket 2U rack server	Up to 48 CPU cores (AMD Opteron 6100)
Online Rack	UPS	Power outage protection

RPM System Overview
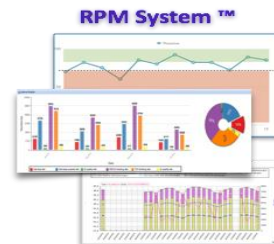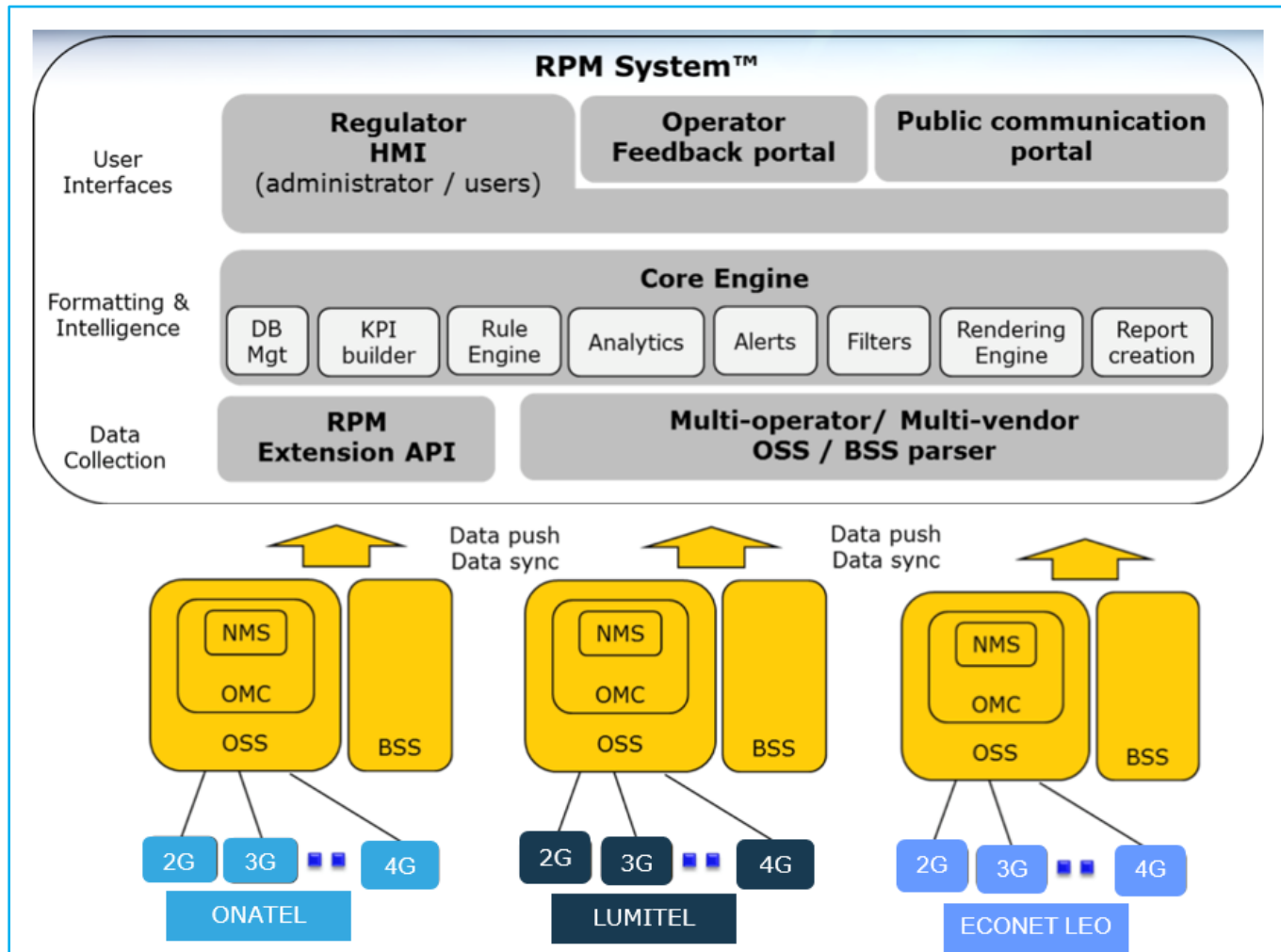
> A huge history of data
>
> - One week for hourly values,
> - 6 months for daily values and for day BH values,
> - 1 year for weekly values,
> - 5 years for monthly values.

> Network coverage through one server
>
> - Around 10 000 cells,
> - 1000 values (counters and KPIs).

> Sharing the RPM system data enterprise-wide
>
> - Up to 25 simultaneous connections to RPM system Web server

> Enlarge your vision
> - Get an overall view of network and services performance.
> - Bring KPI trends, variations, deviations or drifts to light.

> Save time
> - A continuous follow up of network performance without any human intervention.
> - Get smart directions for investigations.

> A help in decision making
> - Align the network path and the QoS with your strategic regulatory goals.

> Enhance your power
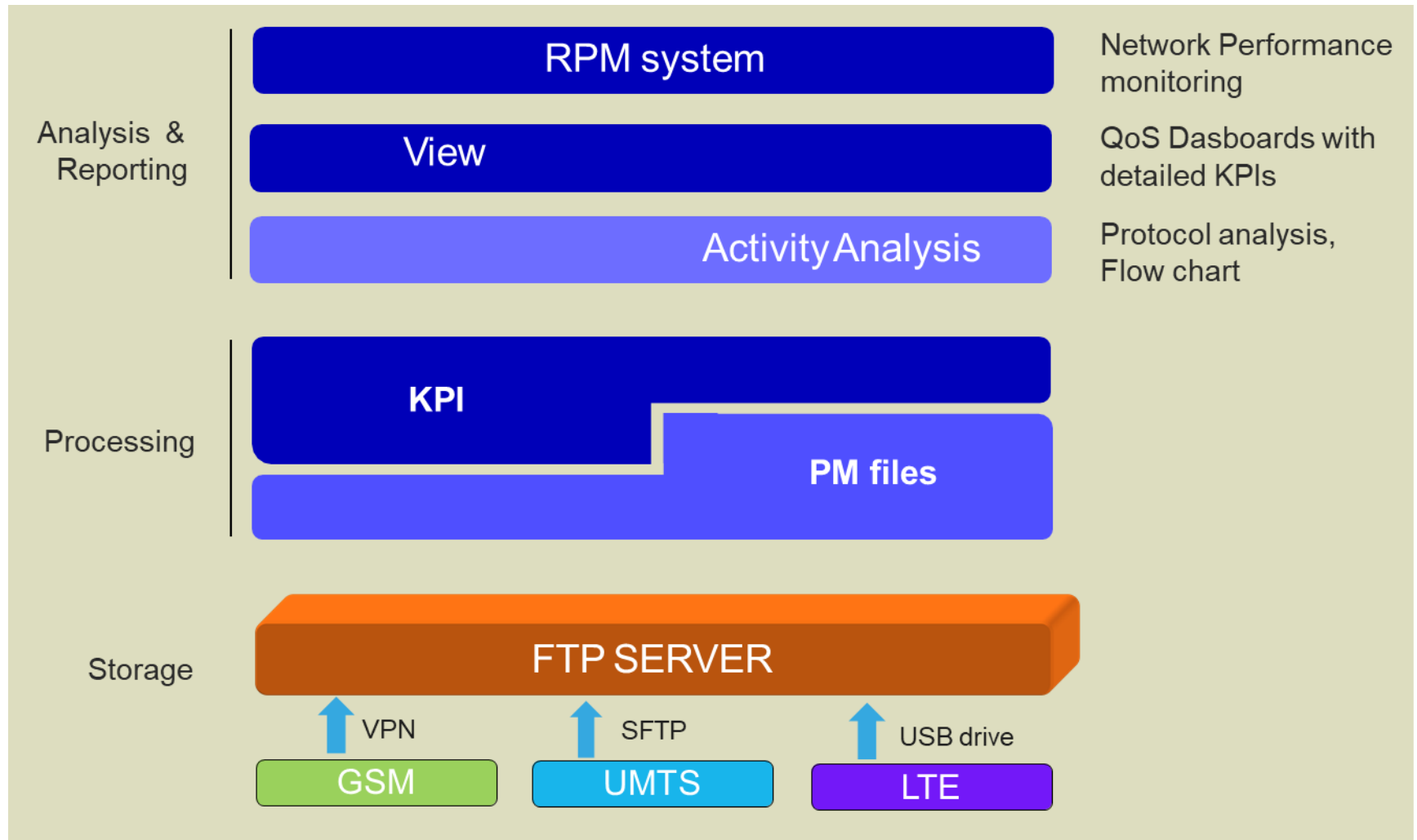> - Select/Benchmark mobile operators with a fair and impartial reference.

**RPM system
(QoS NMS)**
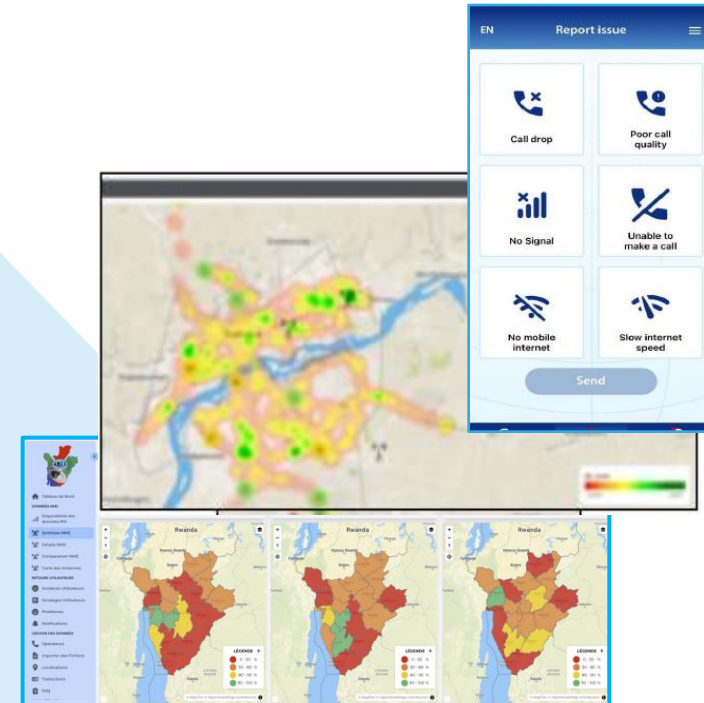
**D.QoS
(Atlas de Couverture)**

> Regulatory Performance Management System (RPM system) provides the following services:

- **Trending** of the network performance over the time,
- **Aggregation** from a cell view to a consolidated view (per network element, municipality, province or network)
- **Centralization** and long term **storage** of information,
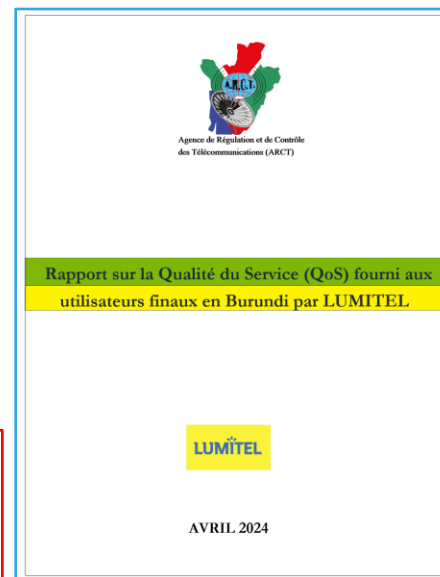- **Alarm** generation,
- **Reporting**.

The connectivity of the RPM system with the OSS of MNOs.

RPM System ™

SNMP/CORBA/FTP — NBI:**Northbound Interface**

LMT

| TM | FM | PM | CM | SM | SWM | SYM | NBI |

Centralized Data center

iManager M2000

MML/BIN/SNMP/FTP — SBI:**Southbound Interface**

BTS BSC MSC UMG GGSN CG SGSN HLR

NodeB RNC S-CSCF MGCF BGCF WASN BTS Router Lanswitch
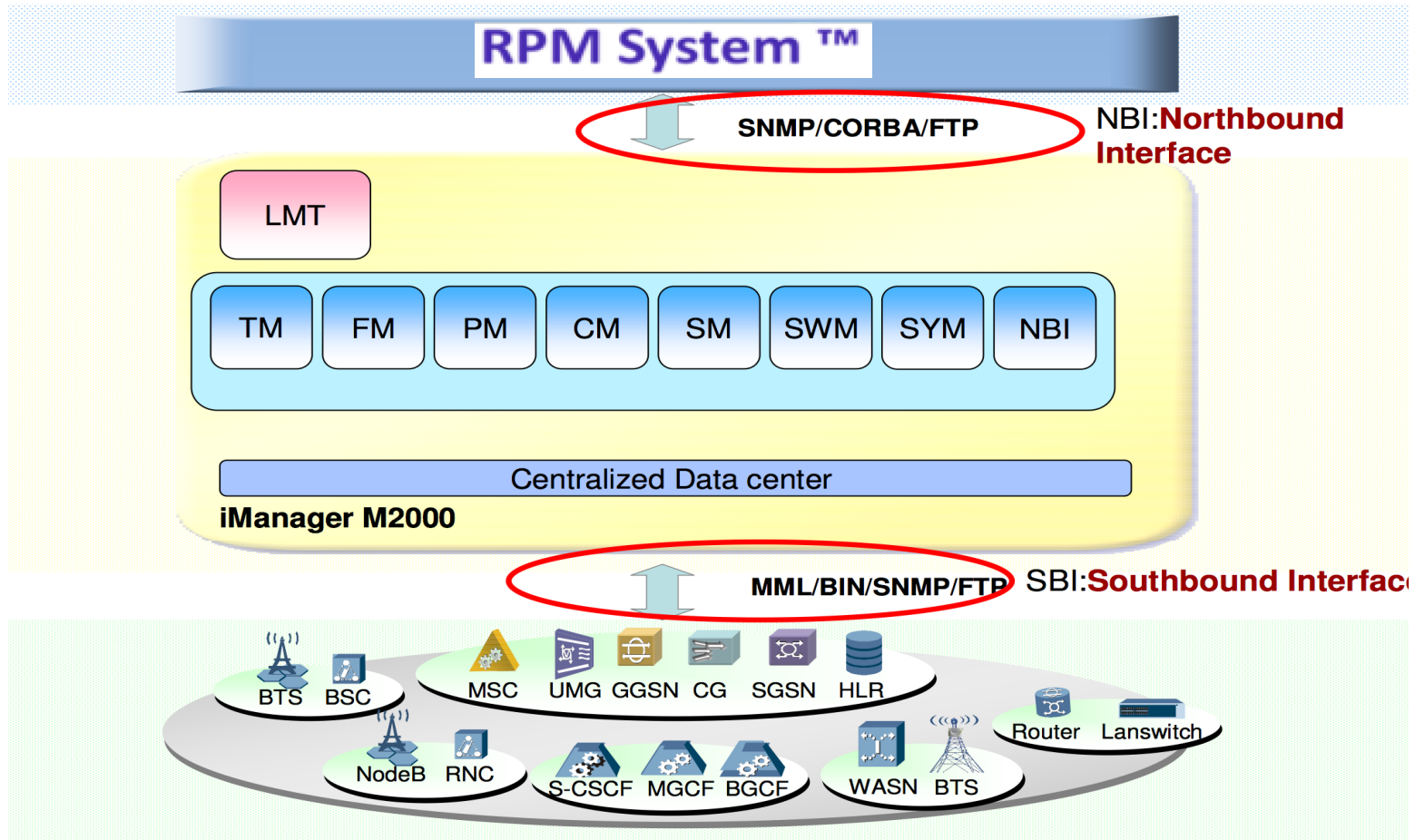
•**All events (FCAPS management files) on the network are recorded and saved on the OSSFTP storage servers.**

RPM System ™ — FTP Client

FM/PM/CM files

```
#ftp 10.11.12.13
FTP> bin
FTP>get …
```

EMS

iManager M2000

FTP Server

Alarm notifications
Measurement reports
Configuration changes

NEs
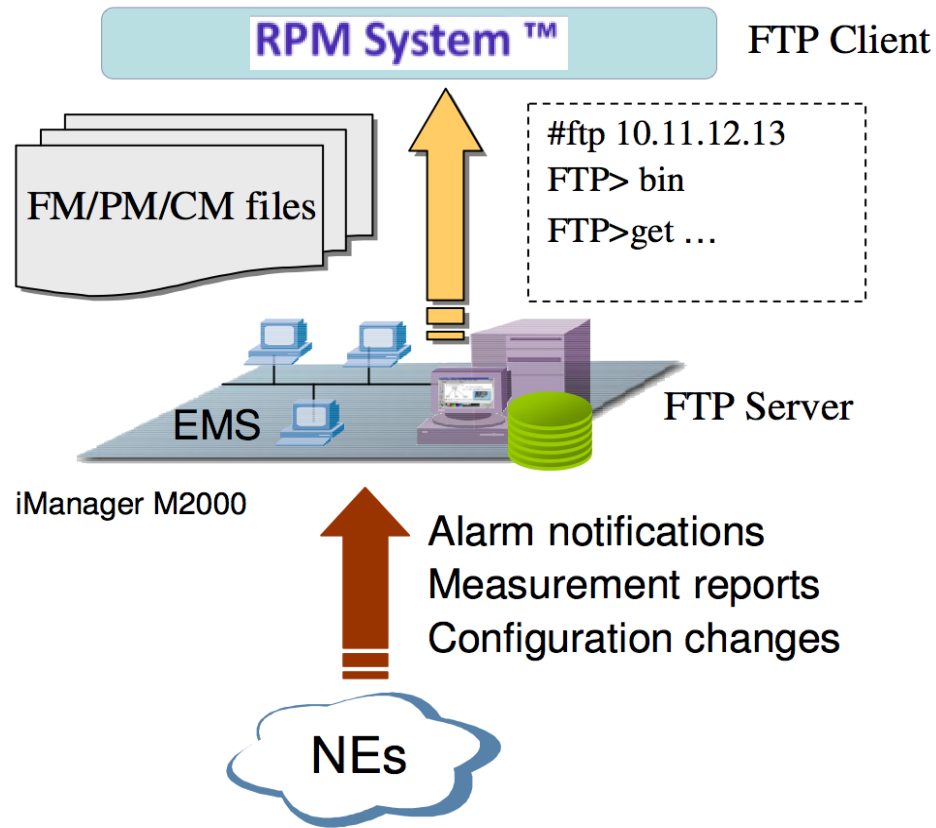
• Regulators are only interested in PM files. An FTP server can be configured securely to automatically retrieve passively PM files from the MNO's OSS FTP storage servers.

1. Collect from FTP server:

➔ Automatic hourly retrieve
➔ FTP or SSH protocol

Raw Counters Stats files

Temp DB
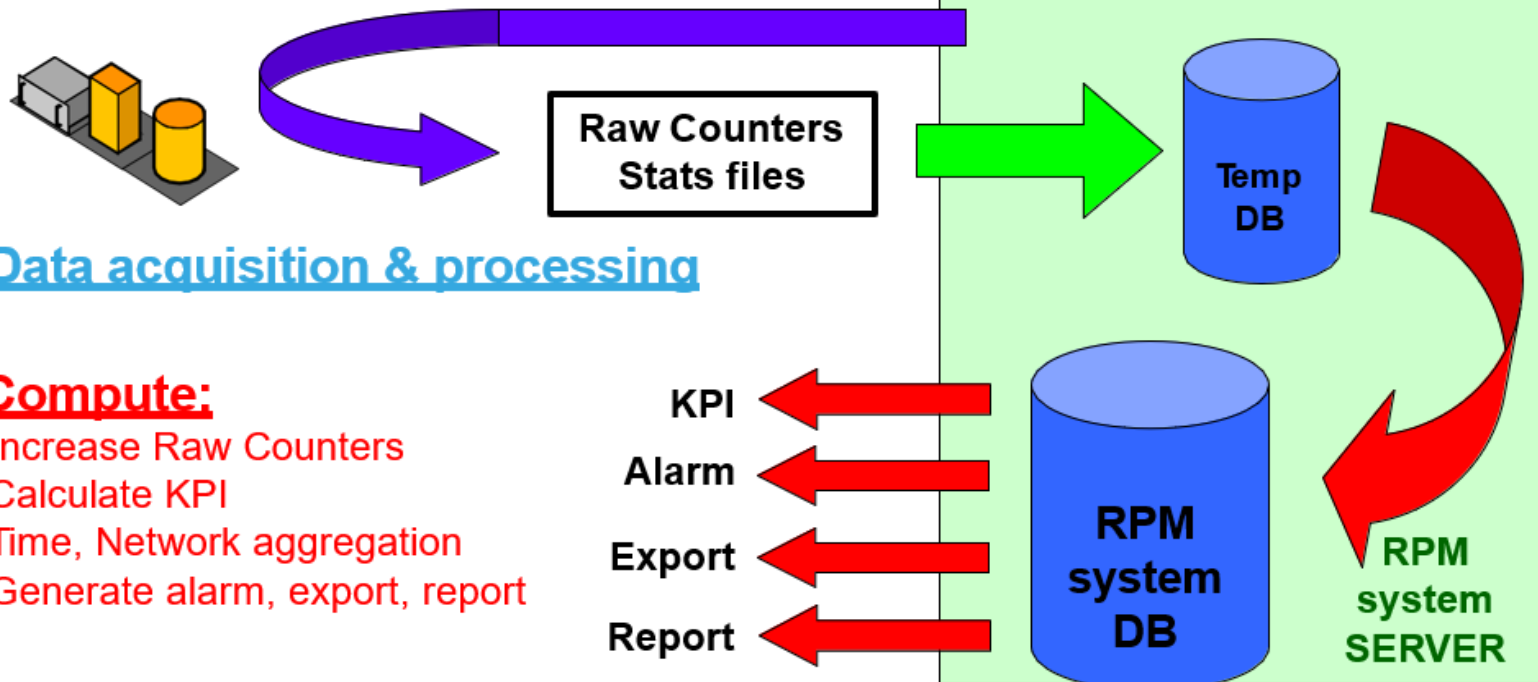
2.Data acquisition & processing

3. Compute:

➔ Increase Raw Counters
➔ Calculate KPI
➔ Time, Network aggregation
➔ Generate alarm, export, report

KPI

Alarm

Export

Report

RPM system DB

RPM system SERVER

« B » OPERATOR
NMS

« C » OPERATOR
NMS

« A » OPERATOR
NMS

VPN

VPN

VPN

NRA
(RPM system)

RPM system administration

Performance monitoring
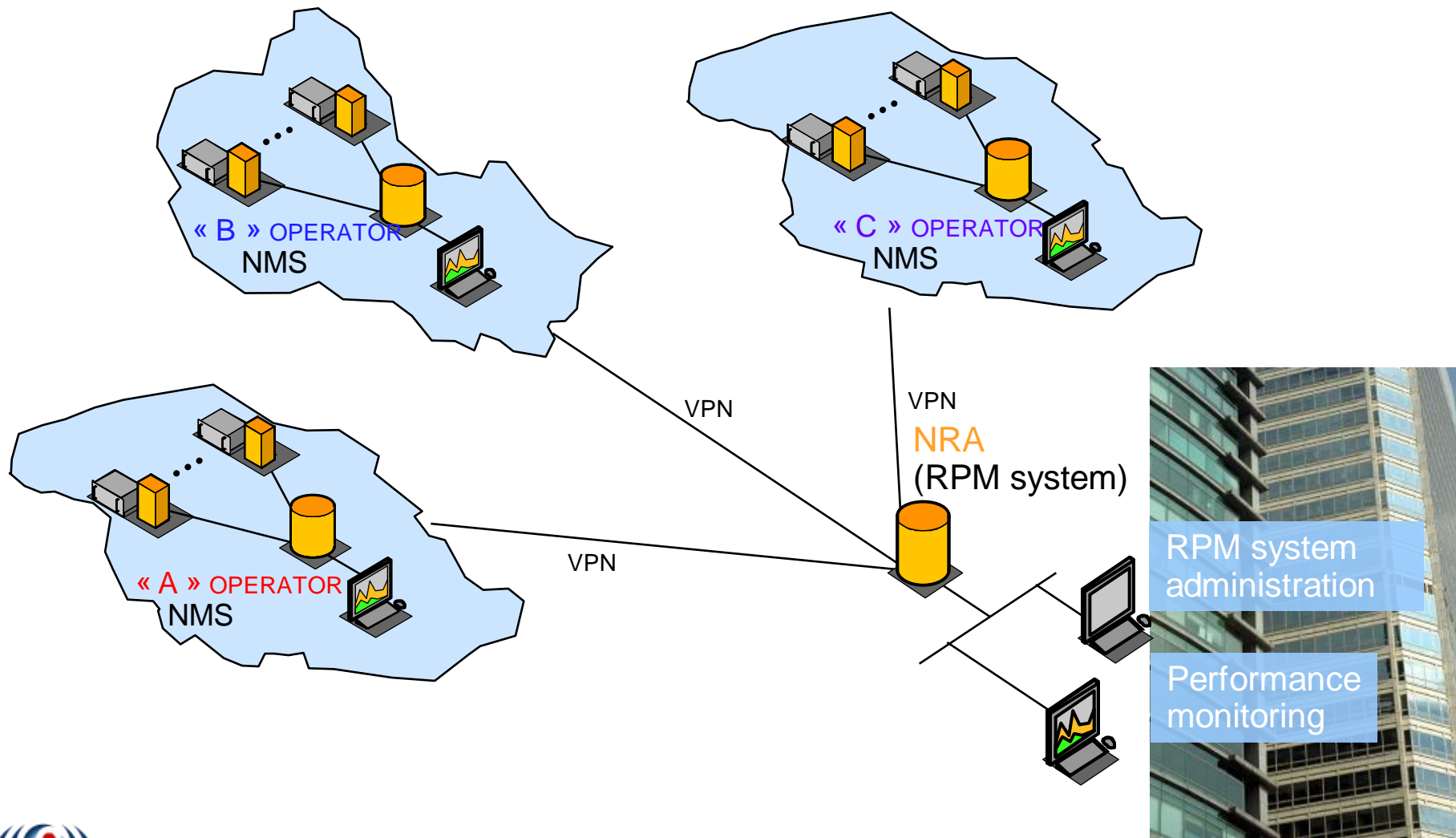
- The ARCT's RPM System tool is configured to monitor the **Quality of Service (QoS) delivered** by mobile operators (MNOs) in Burundi.

- The service quality (QoS) report dashboards can be accessed on the web by MNOs as well as by the public via the D.QoS mobile app.
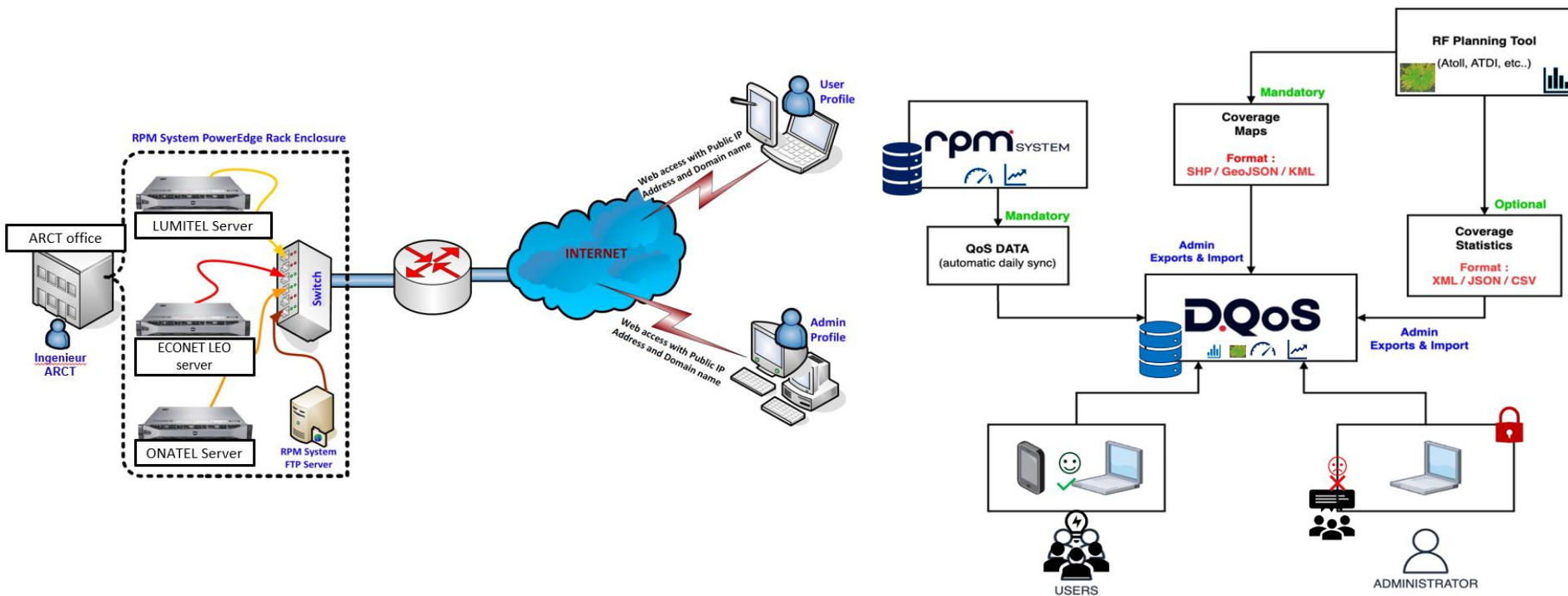
•Objectives

- **Availability of PM files as at when due**

- **Automatic Hourly/Daily/weekly PM File collection.**

•Methodology

- **VPN Connection over Internet**
- **SFTP Connection**
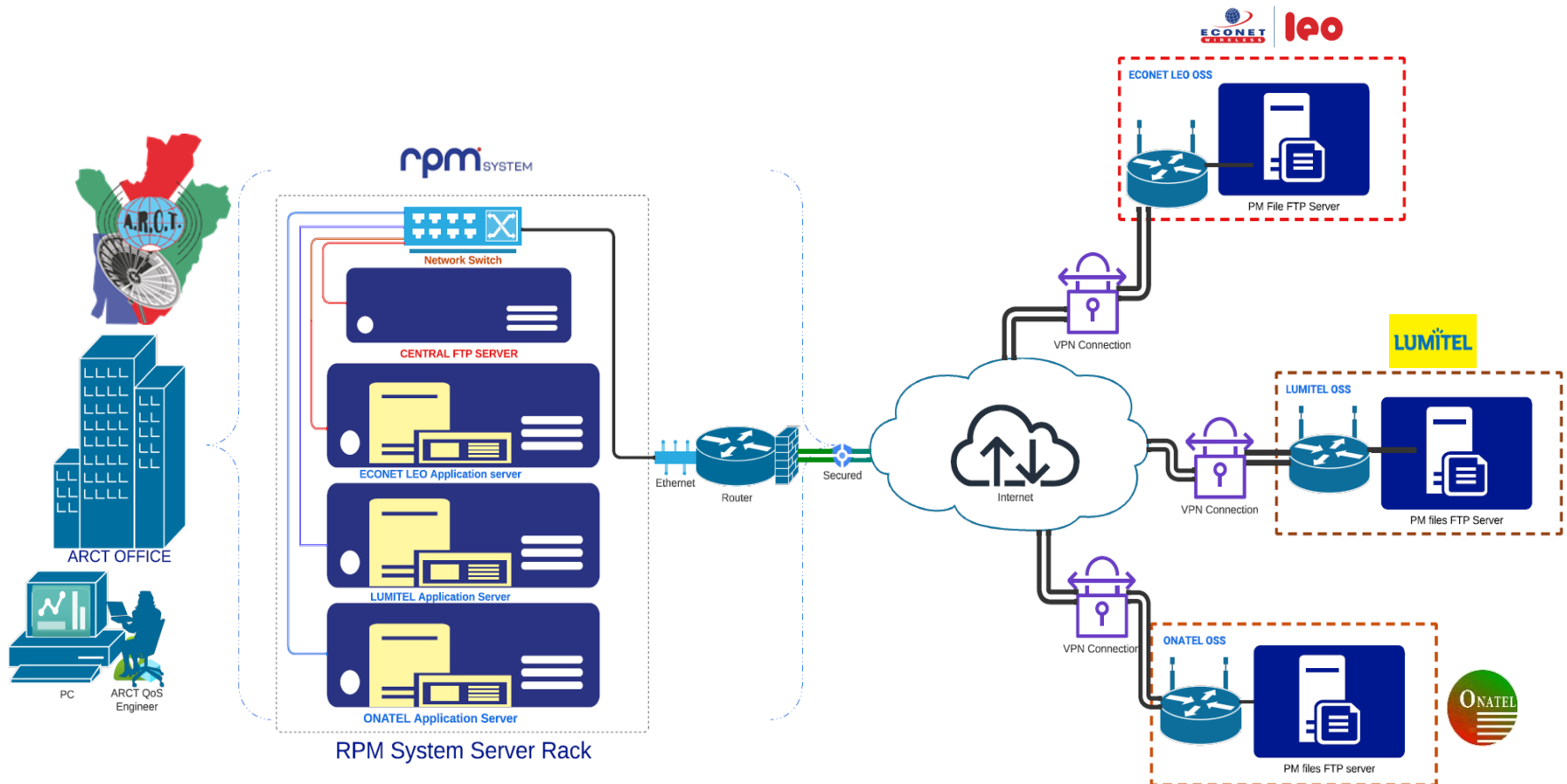
- **Automatic collection of hourly PM files through custom shell scripts at a set frequency.**
- **Less human intervention, thus less risk of PM file corruption.**
- **Minimum required bandwidth of 2 Mbps.**
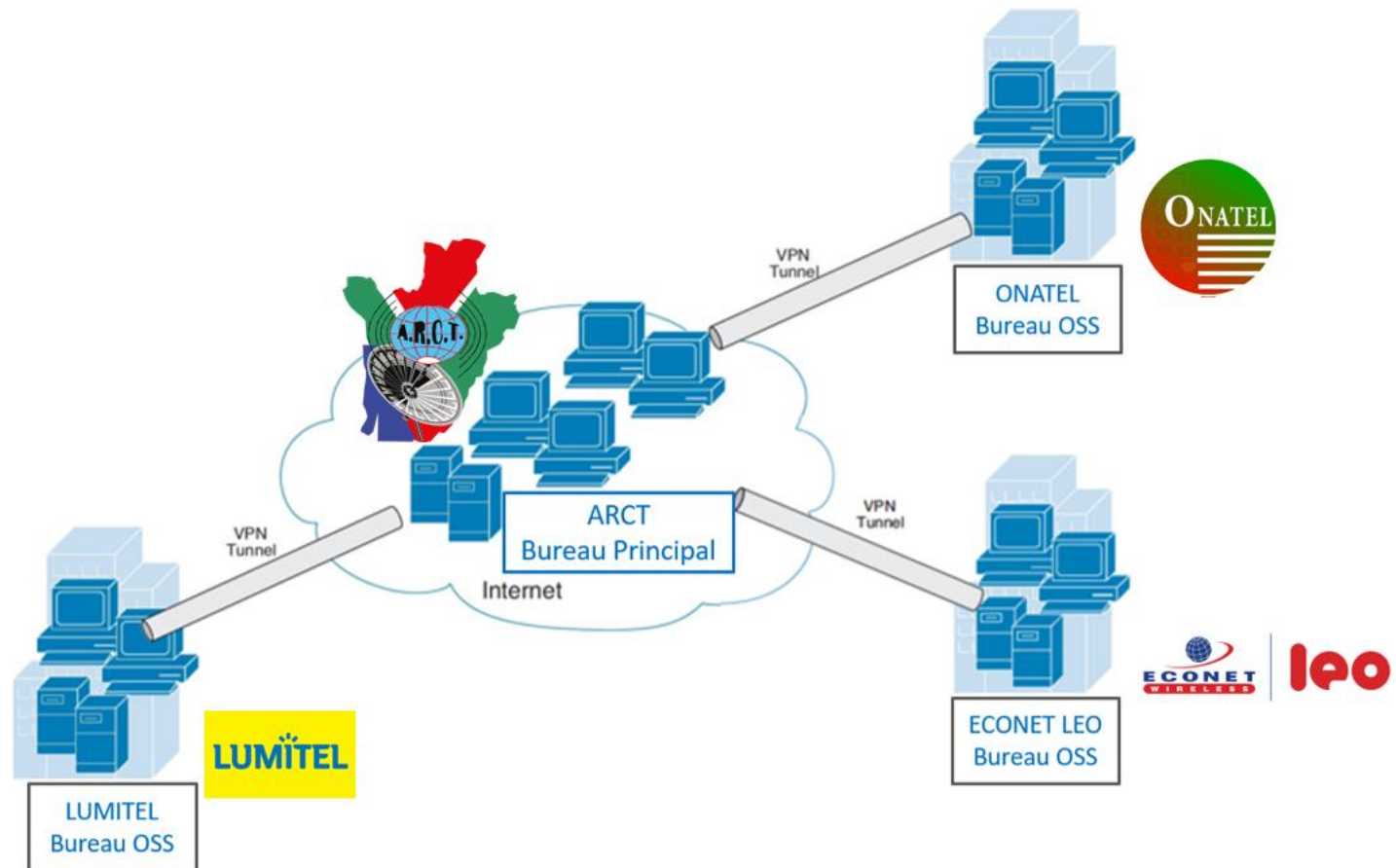
Specification of the FTP server on the MNO's premises.

- Built to Optimize Performance
- For storing PM files of MNOs

Serveur au format rack PowerEdge R250

Fournir la valeur des données

Traitez à moindre coût les charges applicatives courantes de l'entreprise tout en offrant un calcul puissant avec un serveur au format rack 1U d'entrée de gamme.

Fonctionnalité	Caractéristiques techniques
Processeur	Un processeur Intel Xeon série E-2300 avec jusqu'à 8 cœurs
Mémoire	• 4 logements DIMM DDR4, prise en charge max. de 128 Go UDIMM, vitesses allant jusqu'à 3 200 MT/s • Prend en charge uniquement les barrettes DIMM DDR4 ECC sans registre Remarque : pour le processeur Pentium, la vitesse de mémoire maximale prise en charge est de 2 666 MT/s.
Contrôleurs de stockage	• Contrôleurs internes : PERC H345, H355, H755, HBA355i, S150 • Démarrage interne : module SD interne double, USB ou Boot Optimized Storage Subsystem (BOSS-S1) : 2 disques SSD M.2 HWRAID • Adaptateurs HBA externes (non RAID) : HBA355e
Baies de disque	Baies avant : • Jusqu'à 4 disques (durs/SSD) SAS/SATA de 3,5 pouces max. 30,72 To • Jusqu'à 2 disques (durs/SSD) SAS/SATA/NVMe de 3,5 pouces, max. 15,36 To • Jusqu'à 4 disques (durs/SSD) SAS/SATA de 3,5 pouces max. 30,72 To
Blocs d'alimentation	• 450 W Bronze 100-240 VCA, câblé • 450 W Platinum 100-240 VCA, câblé
Options de refroidissement	Refroidissement par air
Ventilateurs	• Jusqu'à sept ventilateurs câblés
Dimension	• Hauteur : 42,8 mm (1,68 pouce) • Largeur : 482 mm (18,97 pouces) • Profondeur : 598,64 mm (23,56 pouces) avec panneau 585 mm (23,03 pouces) sans panneau
Format	Serveur au format rack 1U

Form Factor 1U—19"

Availability

- PM files must be available on the source site/folder as they are generated and become available from the operator.

High-Level QoS KPIs

- High-level key performance indicators intended for audit reports and status reports, based on ITU-T service quality evaluation categories, namely: NA (network availability), SA (service accessibility), SR (service retainability), and SI (service integrity), monitored by radio access technology (RAT).

2G (Voice Service only)

ITU-T QoS Category	TRA KPI NAME
NETWORK AVAILABILITY	CELL DOWNTIME (H)
	CELL AVAILABILITY (%)
	CELL UPTIME (H)
SERVICE ACCESSIBILITY	TCH CONGESTION RATE (%)
	SDCCH CONGESTION RATE (%)
	CALL SUCCESS RATE (%)
	CALL SETUP SUCCESS RATE (%)
SERVICE RETAINABILITY	CALL DROP RATE (%)
	CALL COMPLETION RATE (%)

3G (Voice and Data Services only)

ITU-T QoS Category	TRA KPI NAME
NETWORK AVAILABILITY	CELL DOWNTIME (H)
	CELL AVAILABILITY (%)
	CELL UPTIME (H)
SERVICE ACCESSIBILITY	VOICE BLOCK CALL RATE (%)
	VOICE CALL SETUP SUCCESS RATE (%)
	VOICE CALL SUCCESS RATE (%)
	DATA ACCESS SUCCESS RATE (%)
SERVICE RETAINABILITY	VOICE CALL DROP RATE (%)
	VOICE CALL COMPLETION RATE (%)
	DATA DROP RATE (%)
SERVICE INTEGRITY	DATA DL HS THROUGHPUT (Kbps)

4G (Data Service only)

ITU-T QoS Category	LICENSE KPI NAME	TRA KPI NAME
NETWORK AVAILABILITY	Downtime for Radio Access	CELL DOWNTIME (H)
	Uptime for Radio Access	CELL AVAILABILITY (%)
		CELL UPTIME (H)
		DATA SERVICE AVAILABILITY (%)
SERVICE ACCESSIBILITY	DATA SERVICE ACCESS FAILURE RATE	DATA SERVICE ACCESS FAILURE (%)
	DATA SERVICE ACCESS SUCCESS RATE	DATA SERVICE ACCESS SUCCESS RATE (%)
SERVICE RETAINABILITY	DATA SERVICE DROP RATE	DATA SERVICE DROP RATE (%)
SERVICE INTEGRITY	DOWNLOAD DATA SPEED	DATA DL THROUGHPUT (Mbps)
	UPLOAD DATA SPEED	DATA UL THROUGHPUT (Mbps)

1. PM files for QoS Monitoring and enforcement on cell levels.

2. Topology files (information on the site with azimuth and GPS coordinates) for QoS monitoring at the provincial and communal levels and antenna parameters for coverage prediction.

KPI at cell level (NE)

KPI at vendor level

Alarms values at cell levels

QoS Audit Reports

PM files

RPM system

Topology Update

KPI per Administrative divisions

DQoS portal update

Alarms values per Provinces, Communes

QoS Status Reports
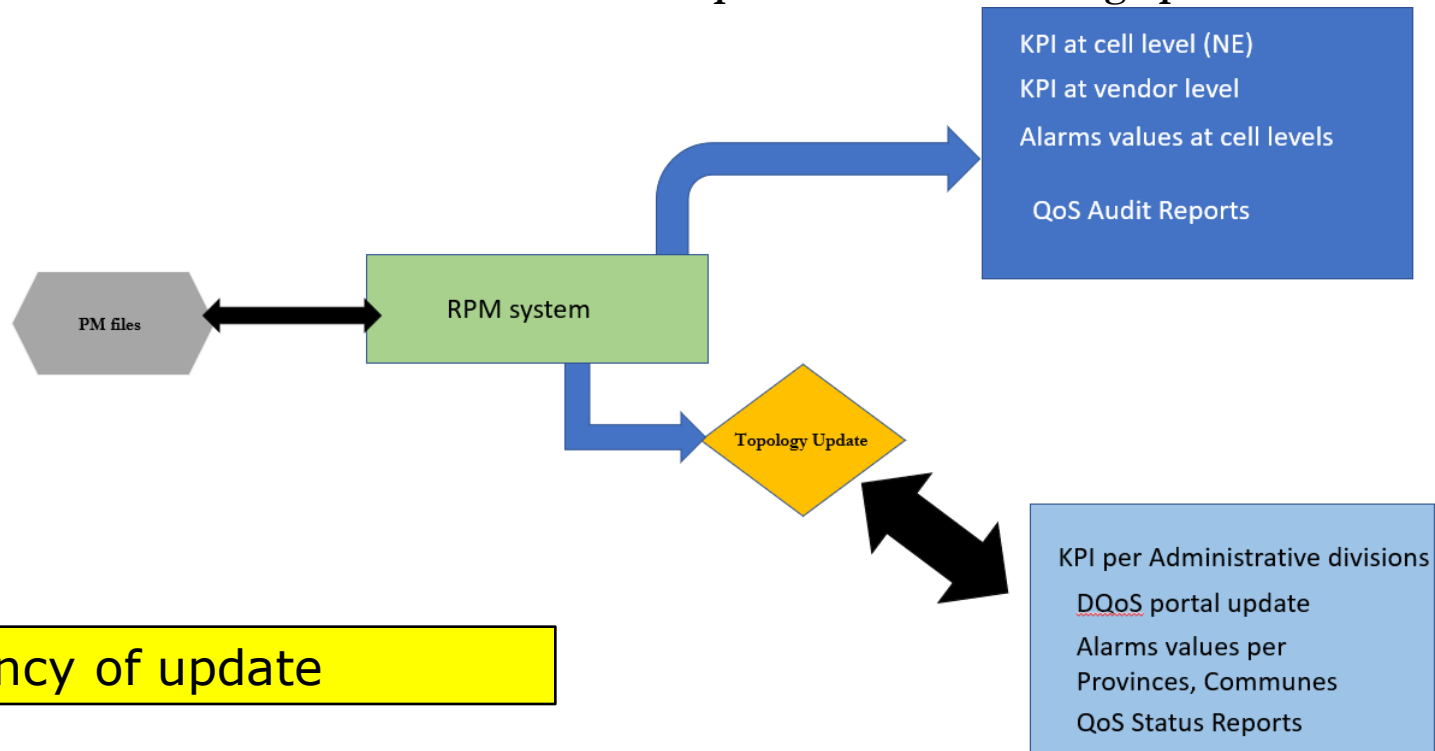
•Frequency of update

1. PM files hourly preferable for near real time monitoring.

2. Twice a month preferably[first and last week of the month].

Topology Template Headers

2G

VENDOR	BSC NAME	BSC ID	BTS NAME	BTS ID	CELL NAME	CELL ID	AZIMUTH	LONGITUDE	LATITUDE	Districts
Huawei										
Ericsson										

3G

VENDOR	RNC NAME	RNC ID	NodeB NAME	NodeB ID	CELL NAME	CELL ID	AZIMUTH	LONGITUDE	LATITUDE	Districts
Huawei										
ZTE										

4G
Huawei

VENDOR	MME ID	SGW NAME	Tracking Area	eNodeB NAME	eNodeB ID	CELL NAME	Local Cell ID	AZIMUTH	LONGITUD	LATITUDE	Districts
Huawei											
Huawei											

Ericsson or Nokia

VENDOR	MME ID	SGW NAME	Tracking Area	eNodeB NAME	eNodeB ID	CELL NAME	Cell ID	AZIMUTH	LONGITUDE	LATITUDE	Districts
Ericsson											
Ericsson											

Frequency of Topology file updates should be twice per month or on demand.

› The KPI formula and related counters will be communicated to the MNOs for review

› The KPI formulas implemented in the RPM system are derived from 3GPP definitions, and the counters are specific to each vendor, adhering to the ITU/ETSI TS 132 410 standards for network audits.

› RPM system also has CO-OP KPI formulas that ARCT might employ for benchmarking purposes in compliance with 3GPP TR 32.814 which have been superseded by ETSI TR 103 559 (08/2019)

- ## e.g. RRC Connection Establishment Success Rate

$$RrcEstabSR = \frac{\sum RRC.SuccConnEstab}{\sum RRC.AttConnEstab}$$

3GPP TS 32. 410

E/// Internal Guide

$$100*\left(\frac{pmTotNoRrcConnectReqSuccess}{pmTotNoRrcConnectReq}\right)$$

KPI formula

pmTotNoRrcConnectReqSuccess/pmTotNoRrcConnectReq*100

RPM system extract

27

e.g. Call Setup Success Rate (CSSR)

- The CSSR can be obtained through **traffic measurement** and **drive tests**.
  The recommended formula for calculating this KPI is as follows:

- CSSR = Successful Assignments/Call-related Requests x 100%

- BSS CSSR = TCH Assignment Success Rate x Immediate Assignment Success Rate x (1 - SDCCH Drop Rate) x 100%

$$CallSetupSuccessRate = \frac{succTCHSeizures}{attTCHSeizures}$$

$$= \frac{succTCHSeizures}{attTCHSeizures} \cdot \frac{succImmediateAssingProcs}{attImmediateAssingProcs}$$

3GPP TR 32.814

3GPP TS 32.410

- **CO-OP KPI formula has a rapprochement with Drive test formula and best used for benchmarking MNOs at network level**

Since August 2019, the ETSI TR 103 559 standard has been the benchmark for MNO performance, covering RAT from 2G to 5G, according to ITU-T QoS categories: NA, SA, SR, and SI.

Based on the vendor, PM files export format could be: ASN.1, CSV, TXT, or XML (3GPP TS 32.401)

For HUAWEI , PM files could be exported in XML or CSV format

OSS Path   …/NBI_PM/pmneexport/neexport_YYYYMMDD (Default)

```
/NBI_PM/pmneexport$ ls
17  neexport_20240306  neexport_20240324
18  neexport_20240307  neexport_20240325
19  neexport_20240308  neexport_20240326
20  neexport_20240309  neexport_20240327
```

XML

```
/NBI_PM/pmneexport/neexport_20240408$
```

- **Correct naming convention for XML PM file for compatibility with RPM system and in tandem with 3GPP TS 32.432**

    AYYYYMMDD.HHMM+UTC-HHMM+UTC_enodeBID.xml   4G (1H)

    AYYYYMMDD.HHMM+UTC-HHMM+UTC_RNCidRNC.xml   3G (30min/1H)

    AYYYYMMDD.HHMM+UTC-HHMM+UTC_BSCIDBSC.xml   2G (1H)

    Ex. A20220831.0000+0200-0100+0200_Aaron Metal Works.xml 4G

    A20220831.0000+0200-0100+0200_FTRNC02.xml   3G

    A20181003.1000+0200-1100+0200_FTBSC03.xml   2G

- **Granularity for 2G , 3G and 4G should not exceed 60min.**

- **For HUAWEI , PM files could be exported in XML or CSV format**

  OSS Path …opt\oss\server\var\fileint\pm\pmexport_YYYMMDD/ (Default)

•<u>CSV</u>

- **Correct naming convention for CSV PM file for compatibility with RPM system and in tandem with 3GPP TS 32.432**

•pmresult_<functionset_ID>_<granularity>_<start datetime(yyyymmddhhmm>_<enddatetime(yyyymmddhhmm>.csv

- ex. pmresult_**127**5072528_**60**_201901140900_201901141000.csv   **2G (1H)**
  pmresult_**671**09391_**30**_201901140930_201901141000.csv   **3G(30 min)**
  pmresult_**152**6726657_**60**_201901140930_201901141000.csv   **4G (1H)**

Where File_ID	2G	127XXX
	3G	671XXX
	4G	152XXX

HOST03_pmresult_1275069419_60_202403310300_202403310400.csv.gz
HOST03_pmresult_1275069419_60_202403310400_202403310500.csv.gz
HOST03_pmresult_1275069419_60_202403310500_202403310600.csv.gz
HOST03_pmresult_1275069419_60_202403310600_202403310700.csv.gz

- **Granularity for 2G and 4G should be 60min where as 3G should be 30min**

UTRAN (3G) :

- **Problème dans la structure du contenu lors de l'export**

•NE=263_20161122162903-1526726662-1

11/19/16 23:00	60	GA_
11/19/16 23:00	60	GA_
11/19/16 23:00	60	GA_
11/20/16 0:00	60	GA_
11/20/16 0:00	60	GA_
11/20/16 0:00	60	GA_

•NodeB 1 → •File ID 1 → •Day1 24H

•NodeB 1 → •File ID 2

•File ID 1 → •Day2 24H
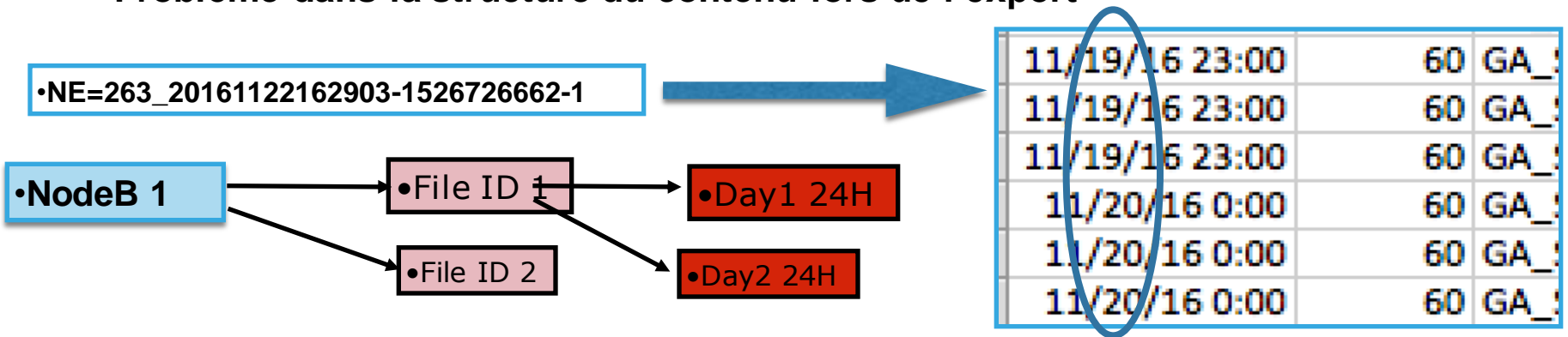
- **Non "OK »et no *<end date><end time>* dans la dénomination, ce qui ne respecte pas *3GPP TS 32.432* qui spécifie clairement qu'il doit y avoir une heure de début et une heure de fin dans la dénomination du fichier PM File.**

•pmresult_1526726660_60_201203301500_201203301600

3/30/12 14:00	60	LTHBC0110005/Ce
3/30/12 14:00	60	LTHBC0110005/Ce
3/30/12 14:00	60	LTHBC0110809/Ce
3/30/12 14:00	60	LTHBC0110809/Ce
3/30/12 14:00	60	LTHBC0110809/Ce
3/30/12 14:00	60	LTHBC0110416/Ce
3/30/12 14:00	60	LTHBC0110416/Ce

•Day 1 24H → •File ID 1/H → •nodeB 1

•Day 1 24H → •File ID1/H+1

•File ID 1/H → •nodeB 2
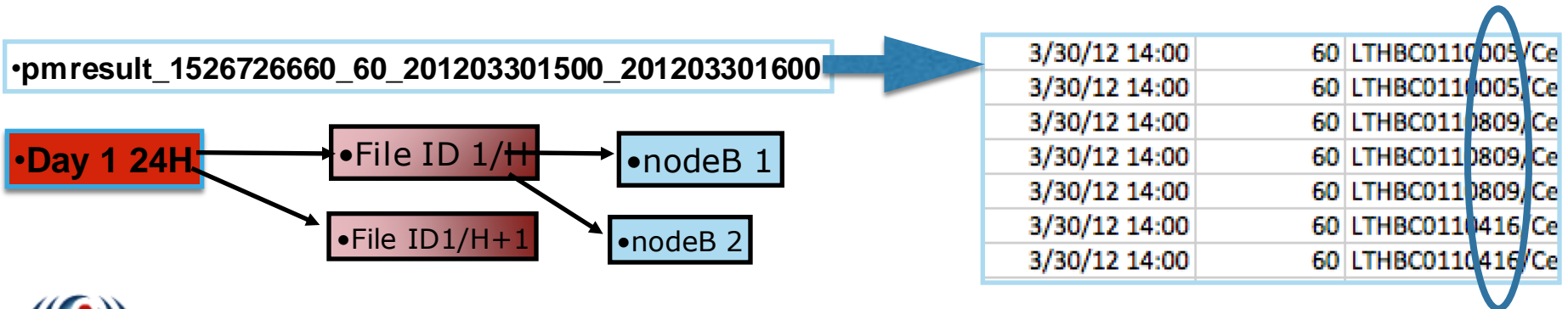
UTRAN (3G) :

Problèmes liés à un _mauvais format de nommage_ lors de l'extract de ces fichiers PM.

- **NE=263_20161122162903-1526726662-1**
- **NE=263_20161122162903-1526726685-1**

Le format correct de dénomination des fichiers PM compatible avec RPM System et en corrélation avec 3GPP TS 32.432

pmresult_<file_ID>_<granularity>_<start datetime(yyyymmddhhmm>_<enddatetime(yyyymmddhhmm>.csv

ex. pmresult_1526726685_60_201203302300_201203310000

Required List of "*functionsetIDs(measInfoId)*" **to be activated** in Huawei **4G** XML PM files submitted should be: **"152xxx" group.**

```
+ <measInfo measInfoId="1526726657">
+ <measInfo measInfoId="1526726659">
+ <measInfo measInfoId="1526726660">
+ <measInfo measInfoId="1526726661">
+ <measInfo measInfoId="1526726662">
+ <measInfo measInfoId="1526726664">
+ <measInfo measInfoId="1526726665">
+ <measInfo measInfoId="1526726666">
+ <measInfo measInfoId="1526726683">
+ <measInfo measInfoId="1526726684">
+ <measInfo measInfoId="1526726685">
+ <measInfo measInfoId="1526726687">
+ <measInfo measInfoId="1526726690">
+ <measInfo measInfoId="1526726693">
+ <measInfo measInfoId="1526726694">
+ <measInfo measInfoId="1526726698">
+ <measInfo measInfoId="1526726699">
+ <measInfo measInfoId="1526726700">
+ <measInfo measInfoId="1526726701">
+ <measInfo measInfoId="1526726702">
+ <measInfo measInfoId="1526726704">
+ <measInfo measInfoId="1526726705">
+ <measInfo measInfoId="1526726706">
+ <measInfo measInfoId="1526726707">
+ <measInfo measInfoId="1526726708">
+ <measInfo measInfoId="1526726709">
+ <measInfo measInfoId="1526726710">
+ <measInfo measInfoId="1526726712">
+ <measInfo measInfoId="1526726722">
```

ALL Radio Network Related Measurements Function Set IDs- Present

• Minimum List that MUST be activated

Family	Function Set IDs	Import
eNodeBCell	1526726657	YES
eNodeBCell	1526726659	YES
eNodeBCell	1526726660	YES
eNodeBCell	1526726661	YES
eNodeBCell	1526726662	YES
eNodeBCell	1526726664	YES
eNodeBCell	1526726700	YES
eNodeBCell	1526726705	YES
eNodeBCell	1526726706	YES
eNodeBCell	1526726708	YES
eNodeBCell	1526726709	YES
eNodeBCell	1526726719	YES
eNodeBCell	1526726722	YES

Based on the vendor, PM files export format could be: ASN.1, CSV, TXT, or XML (3GPP TS 32.401)

For NOKIA , PM files could be exported in XML

OSS Path   /var/opt/nokia/oss/global/mediation/north/pm/export/   (Default)

XML

- **Correct naming convention for XML PM file for compatibility with RPM system**

```
etlexpmx_WCEL_20240411165009_3113640.xml.gz
etlexpmx_WCEL_20240411165009_3133301.xml.gz
etlexpmx_WCEL_20240411165009_3133302.xml.gz
etlexpmx_WCEL_20240411165010_3113642.xml.gz
etlexpmx_WCEL_20240411165010_3133303.xml.gz
```

- •3G WCEL

```
etlexpmx_BTS_20230729150026_1133630.xml.gz
etlexpmx_BTS_20230729150026_3138763.xml.gz
etlexpmx_BTS_20230729150026_3149934.xml.gz
etlexpmx_BTS_20230729150026_4111005.xml.gz
etlexpmx_BTS_20230729150026_4129970.xml.gz
```

- •2G BTS, MRBTS

```
etlexpmx_MRBTS_20240411160051_3121912.xml.gz
etlexpmx_MRBTS_20240411160051_3132885.xml.gz
etlexpmx_MRBTS_20240411160051_3132886.xml.gz
etlexpmx_MRBTS_20240411160051_3141417.xml.gz
```

- •4G MRBTS, LNBTS

- •**Granularity for Nokia PM Files are usually 15 min**

Screenshot Examples Huawei XML

```
/NBI_PM/pmneexport/neexport_20240407$
```

```
KSBSC01                             NOP0022-ILONDA
LKP0001-MAKENI                      NOP0023-ITAMINABASICSCHOOL
LKP0002-CHILANGA                    NOP0024-KASAMA
LKP0003-CHELSTONE                   NOP0025-CHANDAWEYAYA
LKP0004-AIRPORT                     NOP0027-MAKASA
LKP0005-CHINIKA                     NOP0028-KampambaVillage
LKP0006-INDEPENDENCE S              NOP0029-MunwaKubili
LKP0007-ROMA G.H                    NOP0030L-NAKONDE POLICE POST
LKP0008-ROAD JUNCTION               NOP0030-NAKONDE POLICE POST
```

```
5068406 Apr   8 01:28 A20240408.0000+0200-0100+0200_KSBSC01.xml.gz
4760927 Apr   8 02:28 A20240408.0100+0200-0200+0200_KSBSC01.xml.gz
4635311 Apr   8 03:28 A20240408.0200+0200-0300+0200_KSBSC01.xml.gz
4642702 Apr   8 04:28 A20240408.0300+0200-0400+0200_KSBSC01.xml.gz
4837597 Apr   8 05:28 A20240408.0400+0200-0500+0200_KSBSC01.xml.gz
5555296 Apr   8 06:28 A20240408.0500+0200-0600+0200_KSBSC01.xml.gz
6458085 Apr   8 07:28 A20240408.0600+0200-0700+0200_KSBSC01.xml.gz
7287994 Apr   8 08:28 A20240408.0700+0200-0800+0200_KSBSC01.xml.gz
```

```
A20240324.2300+0200-0000+0200_Tlokweng Masetlheng.xml
A20240324.2300+0200-0000+0200_Tlokweng Metlhabeng.xml
A20240324.2300+0200-0000+0200_TlokwengNorthWest.xml
A20240324.2300+0200-0000+0200_TlokwengOasis.xml
```

Screenshot Examples Huawei CSV

```
HOST03_pmresult_67109365_60_202403270800_202403270900.csv
HOST03_pmresult_67109368_60_202403270800_202403270900.csv
HOST03_pmresult_67109369_60_202403270800_202403270900.csv
HOST03_pmresult_67109372_60_202403270800_202403270900.csv
HOST03_pmresult_67109373_60_202403270800_202403270900.csv
HOST03_pmresult_67109376_60_202403270800_202403270900.csv
HOST03_pmresult_67109379_60_202403270800_202403270900.csv
HOST03_pmresult_67109380_60_202403270800_202403270900.csv
```

```
/opt/oss/server/var/fileint/pm/pmexport_20240331
```

```
HOST03_pmresult_1275073218_60_202403311000_202403311100.csv.gz
HOST03_pmresult_1275073218_60_202403311100_202403311200.csv.gz
HOST03_pmresult_1275073218_60_202403311200_202403311300.csv.gz
HOST03_pmresult_1275073218_60_202403311300_202403311400.csv.gz
HOST03_pmresult_1275073218_60_202403311400_202403311500.csv.gz
HOST03_pmresult_1275073218_60_202403311500_202403311600.csv.gz
```

```
HOST03_pmresult_1275071420_60_202403270800_202403270900.csv
HOST03_pmresult_1275071423_60_202403270800_202403270900.csv
HOST03_pmresult_1275071425_60_202403270800_202403270900.csv
HOST03_pmresult_1275071426_60_202403270800_202403270900.csv
HOST03_pmresult_1275071427_60_202403270800_202403270900.csv
```

Screenshot Examples Nokia XML

```
/var/opt/nokia/oss/global/mediation/north/pm/export/
```

```
2024031921    2024033105    2024041113
2024031922    2024033106    2024041114
2024031923    2024033107    2024041115
2024032000    2024033108    2024041116
2024032001    2024033109    2024041117
2024032002    2024033110    2024041118
2024032003    2024033111    npm
2024032004    2024033112    transfer
```

```
97052 Apr 11 16:00 etlexpmx_MRBTS_20240411160051_4146640.xml.gz
98191 Apr 11 16:00 etlexpmx_MRBTS_20240411160052_1119073.xml.gz
74507 Apr 11 16:00 etlexpmx_MRBTS_20240411160052_1119074.xml.gz
79312 Apr 11 16:00 etlexpmx_MRBTS_20240411160052_1119075.xml.gz
```

```
etlexpmx_BSC_20230729150025_1113382.xml.gz      etlexpmx_MRBTS_20230729151536_1113515.xml.gz
etlexpmx_BSC_20230729150027_1113384.xml.gz      etlexpmx_MRBTS_20230729151536_1113516.xml.gz
etlexpmx_BSC_20230729150159_3118170.xml.gz      etlexpmx_MRBTS_20230729151536_1123431.xml.gz
etlexpmx_BSC_20230729151106_2129778.xml.gz      etlexpmx_MRBTS_20230729151536_1123432.xml.gz
etlexpmx_BSC_20230729151108_2130729.xml.gz      etlexpmx_MRBTS_20230729151536_1123433.xml.gz
etlexpmx_BTS_20230729150026_1133630.xml.gz      etlexpmx_MRBTS_20230729151536_1123434.xml.gz
etlexpmx_BTS_20230729150026_3138763.xml.gz      etlexpmx_MRBTS_20230729151536_1123435.xml.gz
etlexpmx_BTS_20230729150026_3149934.xml.gz      etlexpmx_MRBTS_20230729151536_1133781.xml.gz
etlexpmx_BTS_20230729150026_4111005.xml.gz      etlexpmx_MRBTS_20230729151536_1133782.xml.gz
etlexpmx_BTS_20230729150026_4129970.xml.gz      etlexpmx_MRBTS_20230729151536_1133784.xml.gz
etlexpmx_BTS_20230729150026_4130954.xml.gz      etlexpmx_MRBTS_20230729151536_1133785.xml.gz
etlexpmx_BTS_20230729150027_1133631.xml.gz      etlexpmx_MRBTS_20230729151536_2110129.xml.gz
etlexpmx_BTS_20230729150027_3138764.xml.gz      etlexpmx_MRBTS_20230729151536_2110130.xml.gz
```

THANKS

Planet Network
International