Session 11: Improving quality: Case studies

Use cases on how to monitor and improve E2E performance

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Who is speaking ?

- José Ruy - Brazilian, from Belo Horizonte, Minas Gerais
- Electrical Engineer, specialized in Telecommunications and Computer Science by UFMG, with MBA in project management by FGV
- In the telecom industry for over 11 years
- Product Manager of an OSS-Based solution software
- This software won as the best one in its category in well know events of the industry in LATAM (2016), MENA (2017) and Africa (2017)

QoS, QoE: something to think

- Are the networks working 100% with no fails ?

- If the network has no fails, QoS = 100%, what would be the QoE ?

- And if still the QoE is not 100%, what can you do ?

QoS: what can we do to improve it

- A good network performance is the 1st step

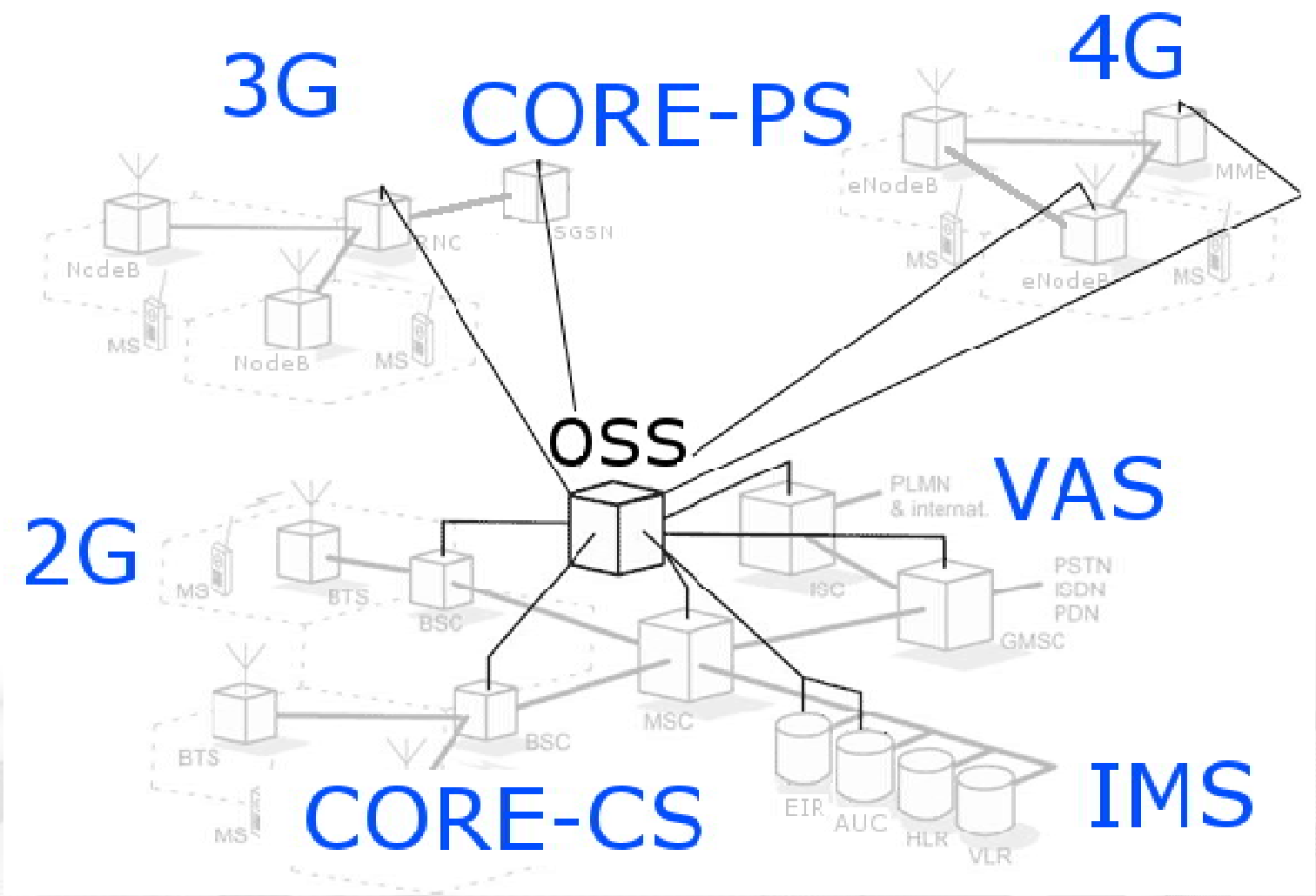
- Problems can be basically at the network, the UE or the interfaces (air, fiber)

- We will tackle Network problems

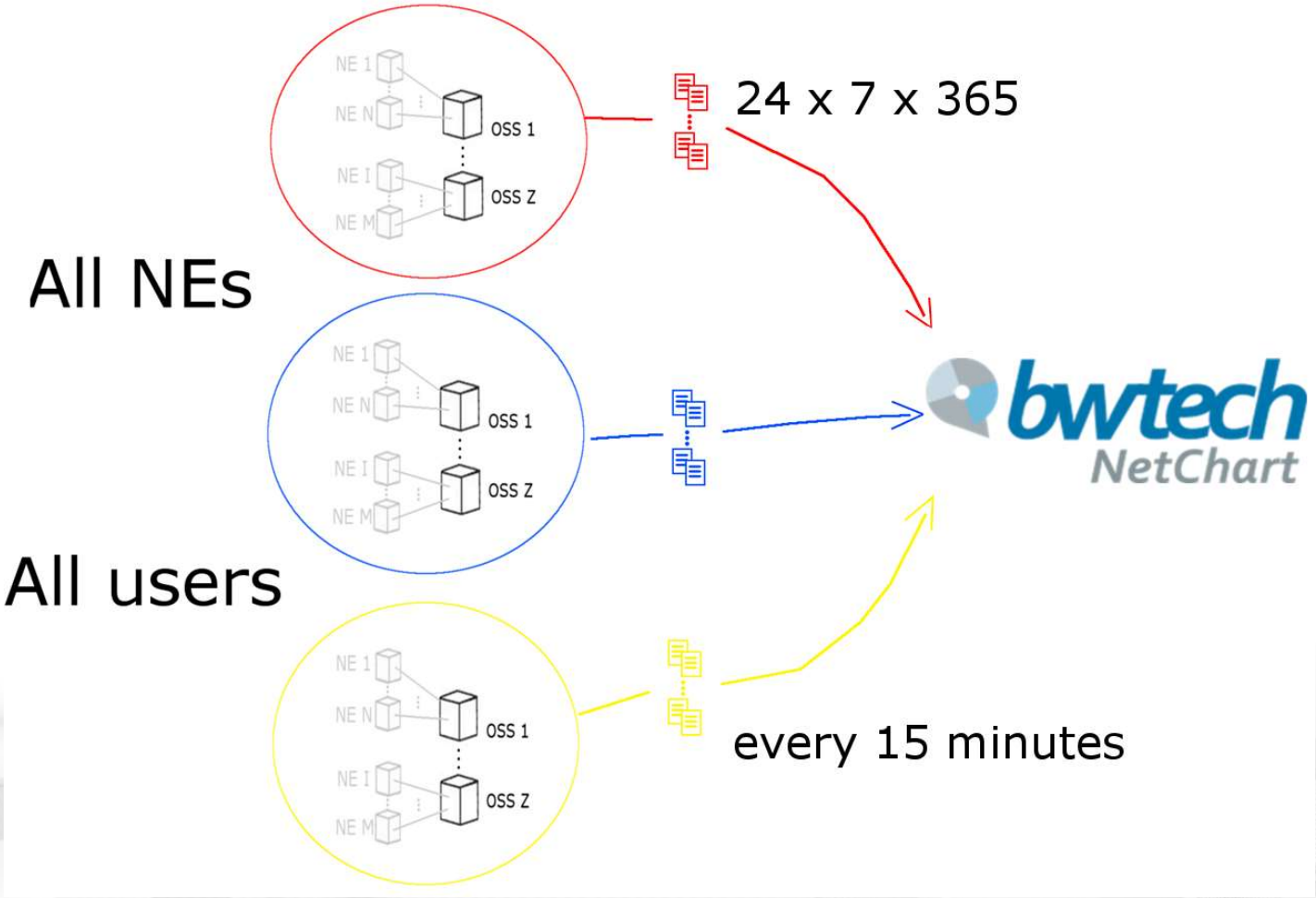
OSS Data

end-to-end

OSS – Operation Support System



OSS – Data Reporting



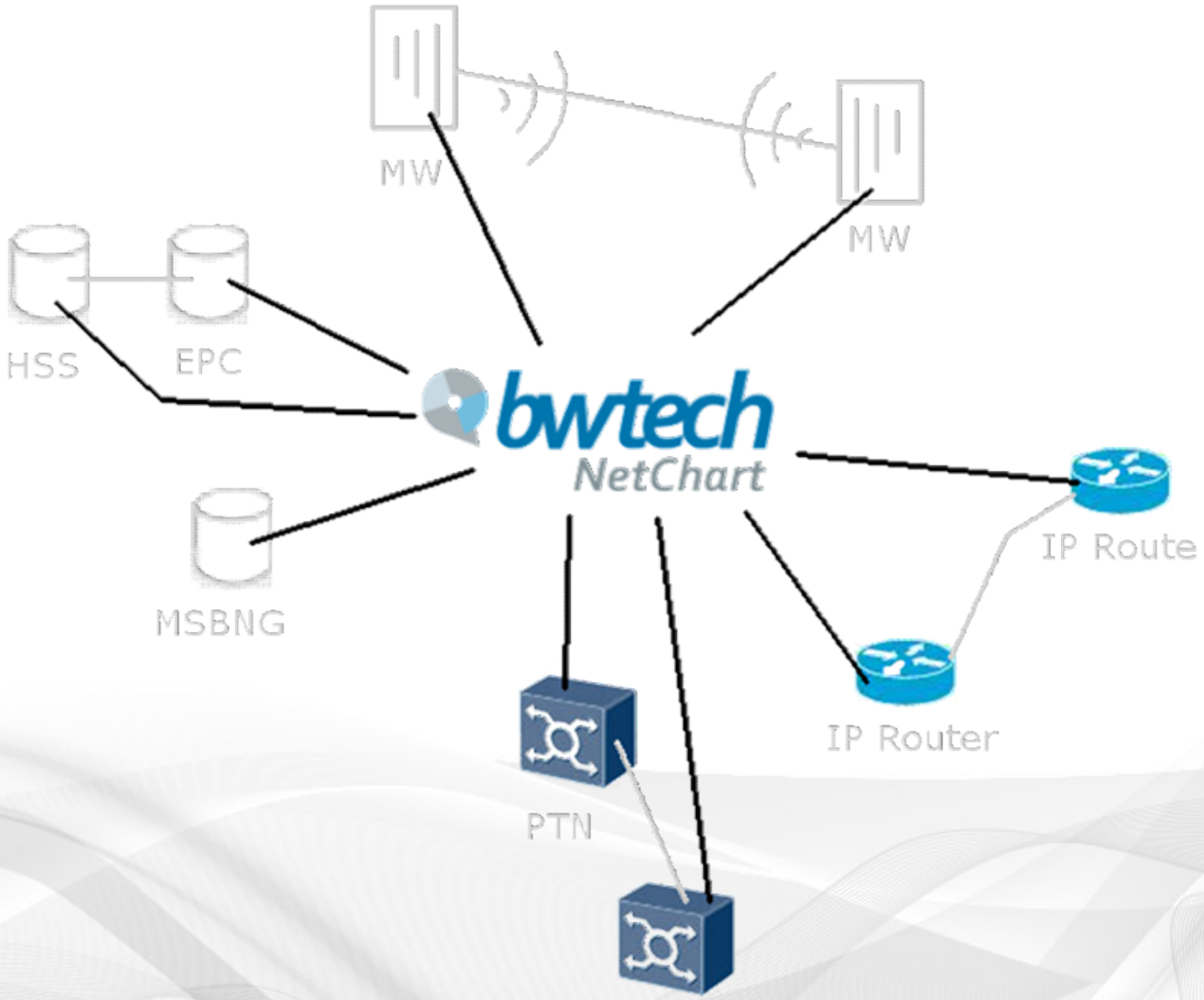
OSS – What Data

- CM: Configuration Management
- PM: Performance Management
- FM: Fault
- TM: Traces
- LM: Licenses
- HM: Hardware

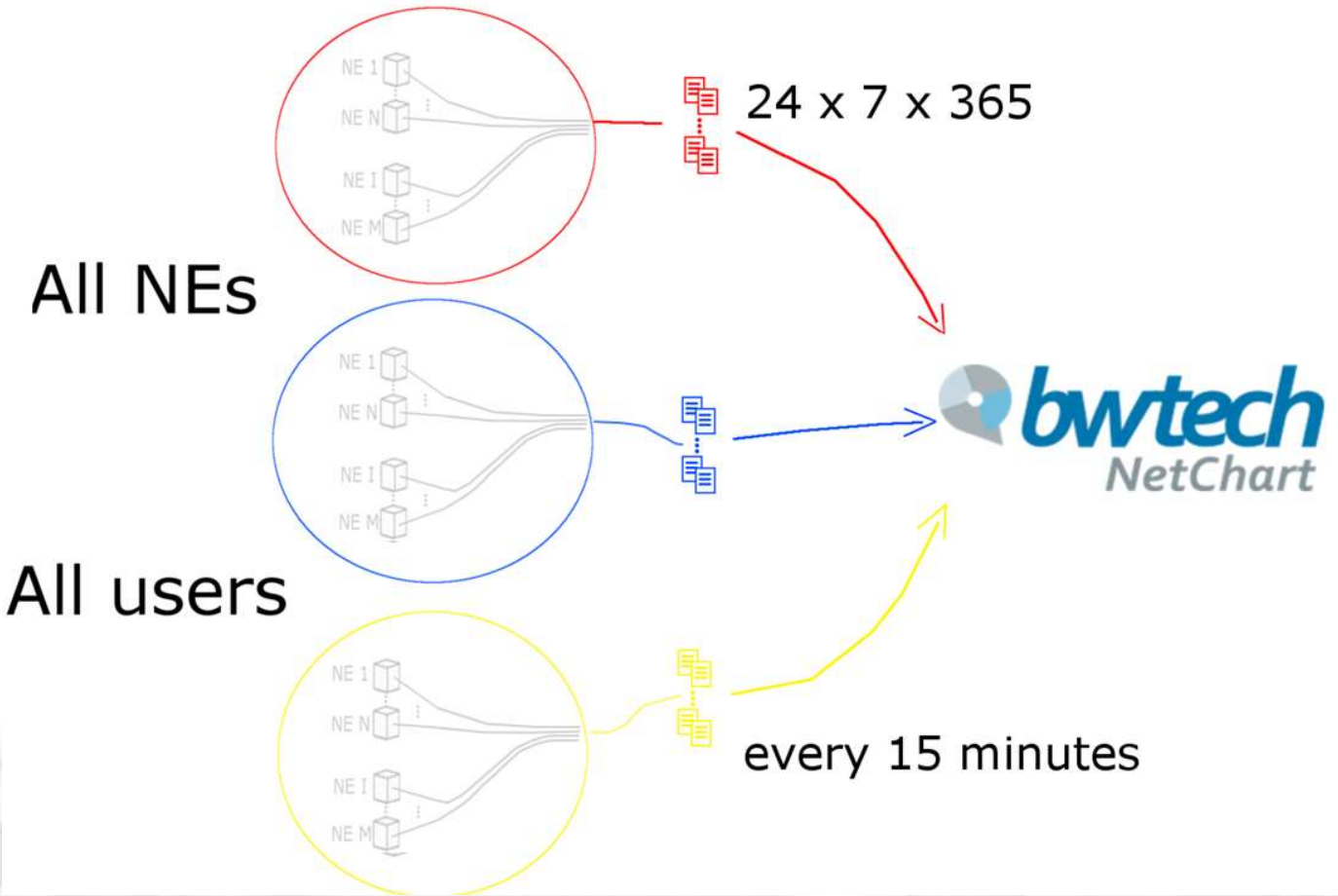
Equipment with no OSS

CORE, Microwave, IP

Equipment with no OSS



Equipment with no OSS – Data Reporting

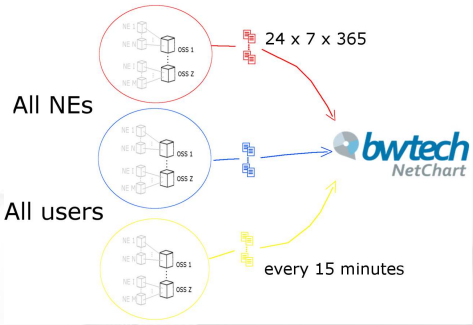


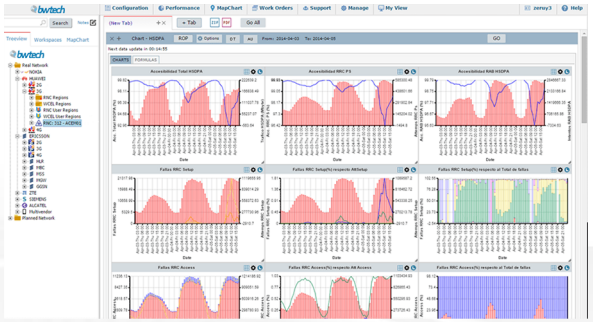
Network Monitoring

End to end

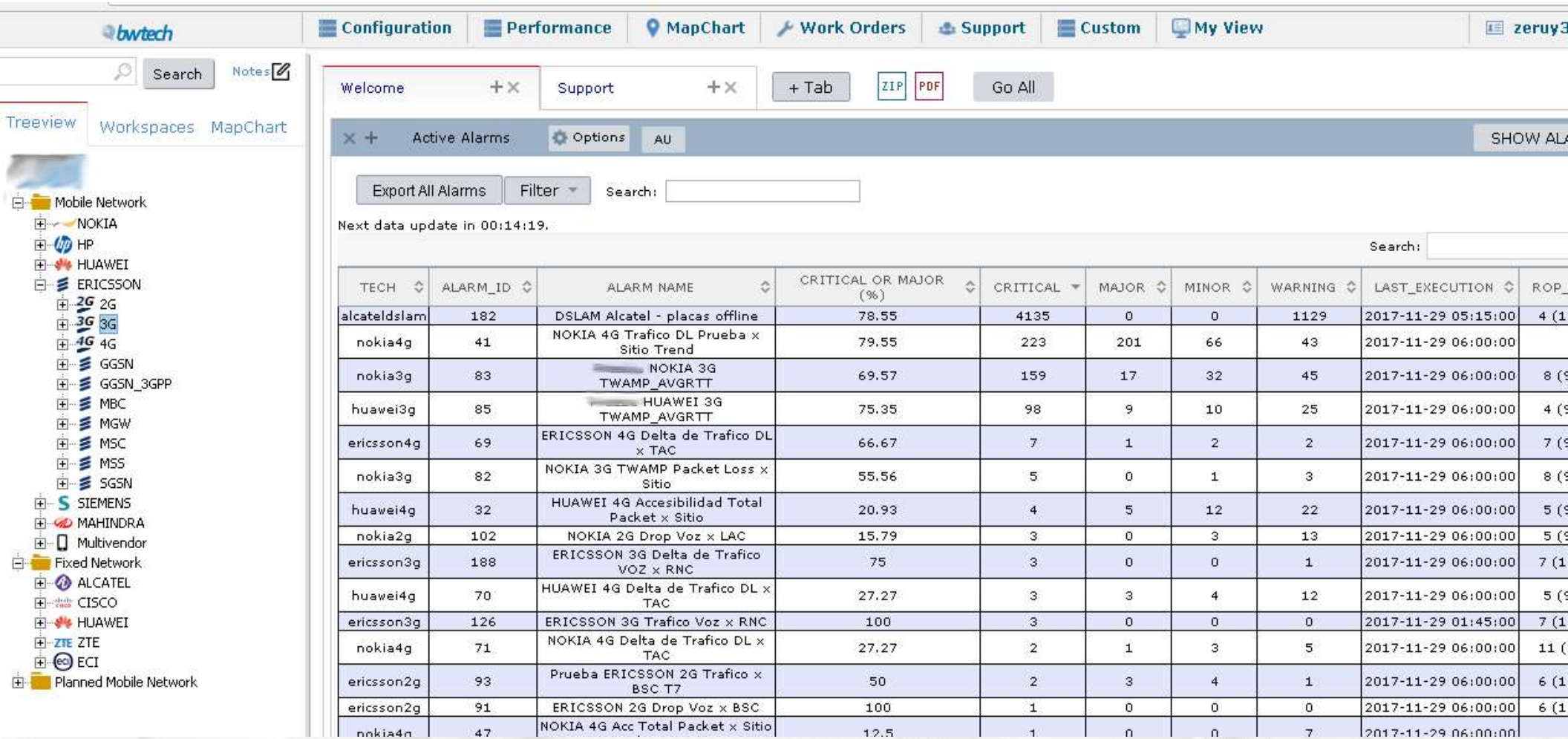
Network Monitoring End to End

- Many different equipments
- Unified view: reduce complexity
- Use Case: operator NOC – Network Operation Center – 24 x 7





Use case: Unified View



TECH	ALARM_ID	ALARM NAME	CRITICAL OR MAJOR (%)	CRITICAL	MAJOR	MINOR	WARNING	LAST_EXECUTION	ROP_
alcateldslam	182	DSLAM Alcatel - placas offline	78.55	4135	0	0	1129	2017-11-29 05:15:00	4 (1
nokia4g	41	NOKIA 4G Trafico DL Prueba x Sitio Trend	79.55	223	201	66	43	2017-11-29 06:00:00	
nokia3g	83	[redacted] NOKIA 3G TWAMP_AVGRTT	69.57	159	17	32	45	2017-11-29 06:00:00	8 (9
huawei3g	85	[redacted] HUAWEI 3G TWAMP_AVGRTT	75.35	98	9	10	25	2017-11-29 06:00:00	4 (9
ericsson4g	69	ERICSSON 4G Delta de Trafico DL x TAC	66.67	7	1	2	2	2017-11-29 06:00:00	7 (9
nokia3g	82	NOKIA 3G TWAMP Packet Loss x Sitio	55.56	5	0	1	3	2017-11-29 06:00:00	8 (9
huawei4g	32	HUAWEI 4G Accesibilidad Total Packet x Sitio	20.93	4	5	12	22	2017-11-29 06:00:00	5 (9
nokia2g	102	NOKIA 2G Drop Voz x LAC	15.79	3	0	3	13	2017-11-29 06:00:00	5 (9
ericsson3g	188	ERICSSON 3G Delta de Trafico VOZ x RNC	75	3	0	0	1	2017-11-29 06:00:00	7 (1
huawei4g	70	HUAWEI 4G Delta de Trafico DL x TAC	27.27	3	3	4	12	2017-11-29 06:00:00	5 (9
ericsson3g	126	ERICSSON 3G Trafico Voz x RNC	100	3	0	0	0	2017-11-29 01:45:00	7 (1
nokia4g	71	NOKIA 4G Delta de Trafico DL x TAC	27.27	2	1	3	5	2017-11-29 06:00:00	11 (
ericsson2g	93	Prueba ERICSSON 2G Trafico x BSC T7	50	2	3	4	1	2017-11-29 06:00:00	6 (1
ericsson2g	91	ERICSSON 2G Drop Voz x BSC	100	1	0	0	0	2017-11-29 06:00:00	6 (1
nokia4g	47	NOKIA 4G Acc Total Packet x Sitio	12.5	1	0	0	7	2017-11-29 06:00:00	

Network Monitoring End to End - Identify

- Something is outside the thresholds
- Something is outside the normal behavior
- Something will probably be outside the normal behavior

ALARM_ID	ALARM NAME	STATE CHANGES	ELEMENT ID	ELEMENT NAME	STATUS	KPI	CI	LAST ALARM REPORTED	ROP OFFSET
102	NOKIA 2G Drop Voz x LAC	12	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	warning	2.65	100	2017-11-29 05:00:00	5
102	NOKIA 2G Drop Voz x LAC	2	nokia2g__bts-box-c__bts-r__160043__	LAC_REGIONS/LAC_1406	warning	5.56	100	2017-11-29 05:00:00	5
102	NOKIA 2G Drop Voz x LAC	1	nokia2g__bts-box-c__bts-r__287715__	LAC_REGIONS/LAC_1814	critical	33.33	100	2017-11-29 05:00:00	5
102	NOKIA 2G Drop Voz x LAC	1	nokia2g__bts-box-c__bts-r__284674__	LAC_REGIONS/LAC_402	critical	25	100	2017-11-29 05:00:00	5
102	NOKIA 2G Drop Voz x LAC	1	nokia2g__bts-box-c__bts-r__274752__	LAC_REGIONS/LAC_801	minor	10	73	2017-11-29 05:00:00	5

arning | Minor | Major | Critical

Search:

ID	ALARM NAME	ELEMENT ID	ELEMENT NAME	TIME	STATUS	KPI	CI
102	NOKIA 2G Drop Voz x LAC	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	2017-11-29 05:00:00	warning	2.65	100
102	NOKIA 2G Drop Voz x LAC	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	2017-11-29 04:45:00	minor	13.1	100
102	NOKIA 2G Drop Voz x LAC	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	2017-11-29 04:30:00	critical	22.86	100
102	NOKIA 2G Drop Voz x LAC	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	2017-11-29 04:15:00	minor	14.29	100
102	NOKIA 2G Drop Voz x LAC	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	2017-11-29 03:45:00	critical	35.42	100
102	NOKIA 2G Drop Voz x LAC	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	2017-11-29 03:15:00	major	19.51	100
102	NOKIA 2G Drop Voz x LAC	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	2017-11-29 02:45:00	critical	29.31	100
102	NOKIA 2G Drop Voz x LAC	nokia2g__bts-box-c__bts-r__264050__	LAC_REGIONS/LAC_1614	2017-11-29	major	18.82	100

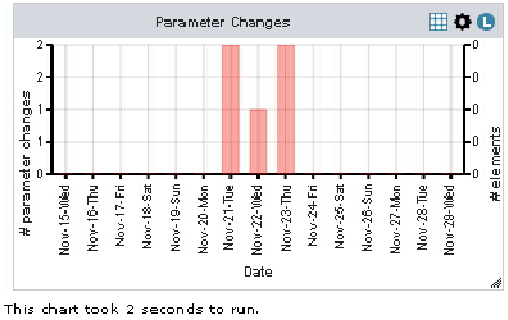
CHARTS | FORMULAS

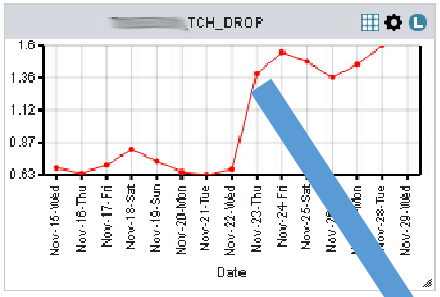
Network Optimization

Solving the problem

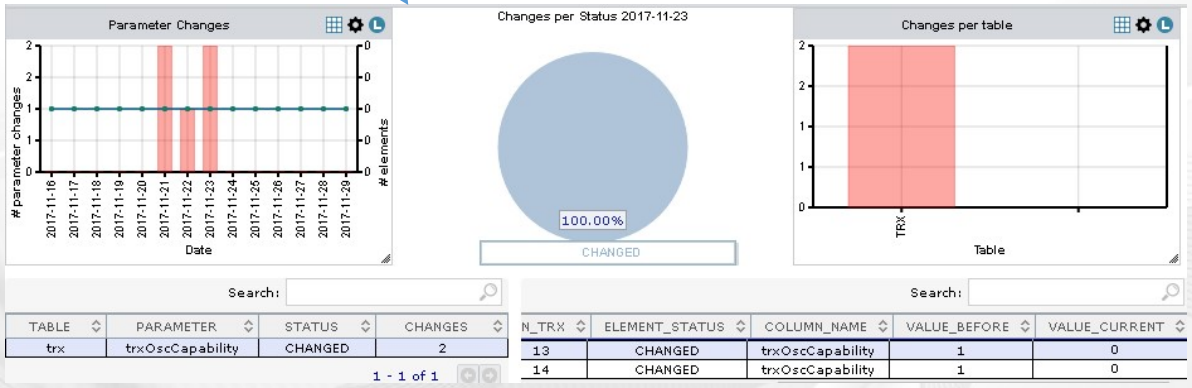
Network Optimization – solving the problem

- Found the bad performance element, what now ?
- Too much data… Correlation! PM, CM, FM





CM change found!



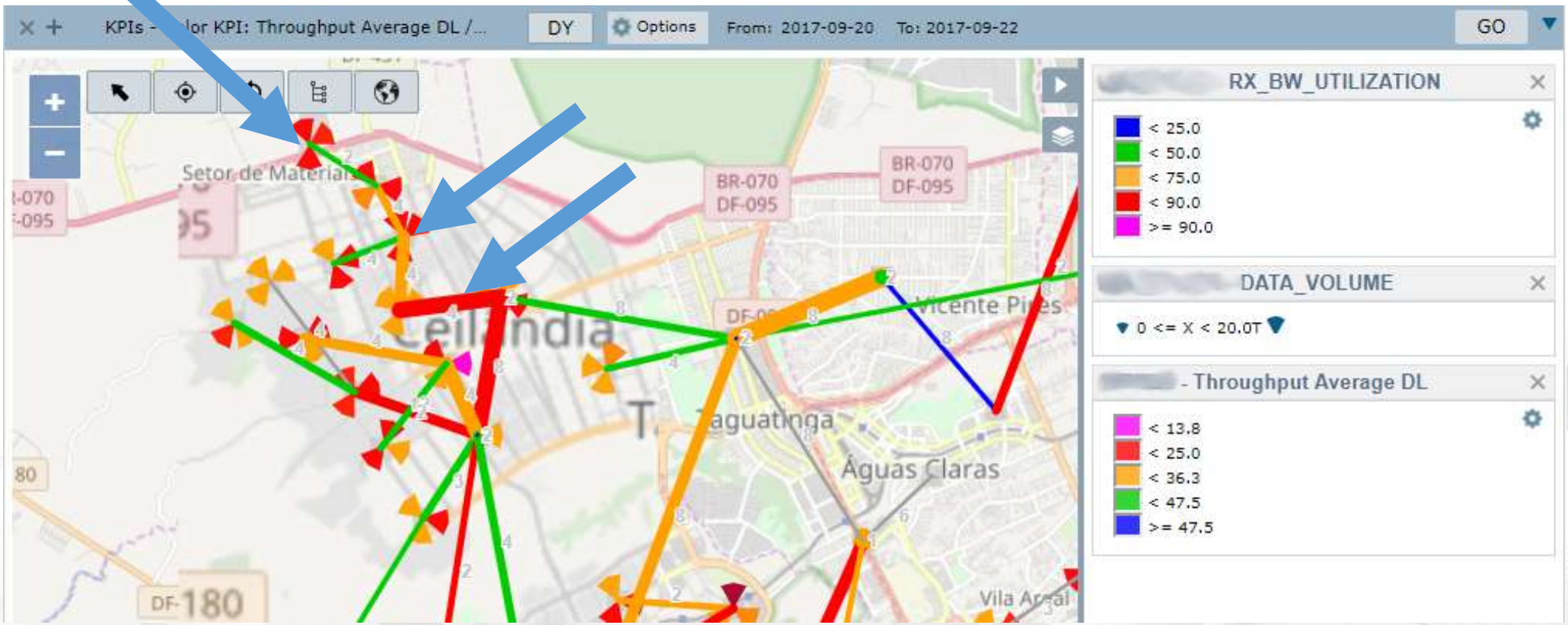
But… What if the problem is not in the element itself ?

Network Optimization

End to end

Network Optimization – end to end

- Use case: transmission affecting cell downlink throughput



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Thank You!

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