

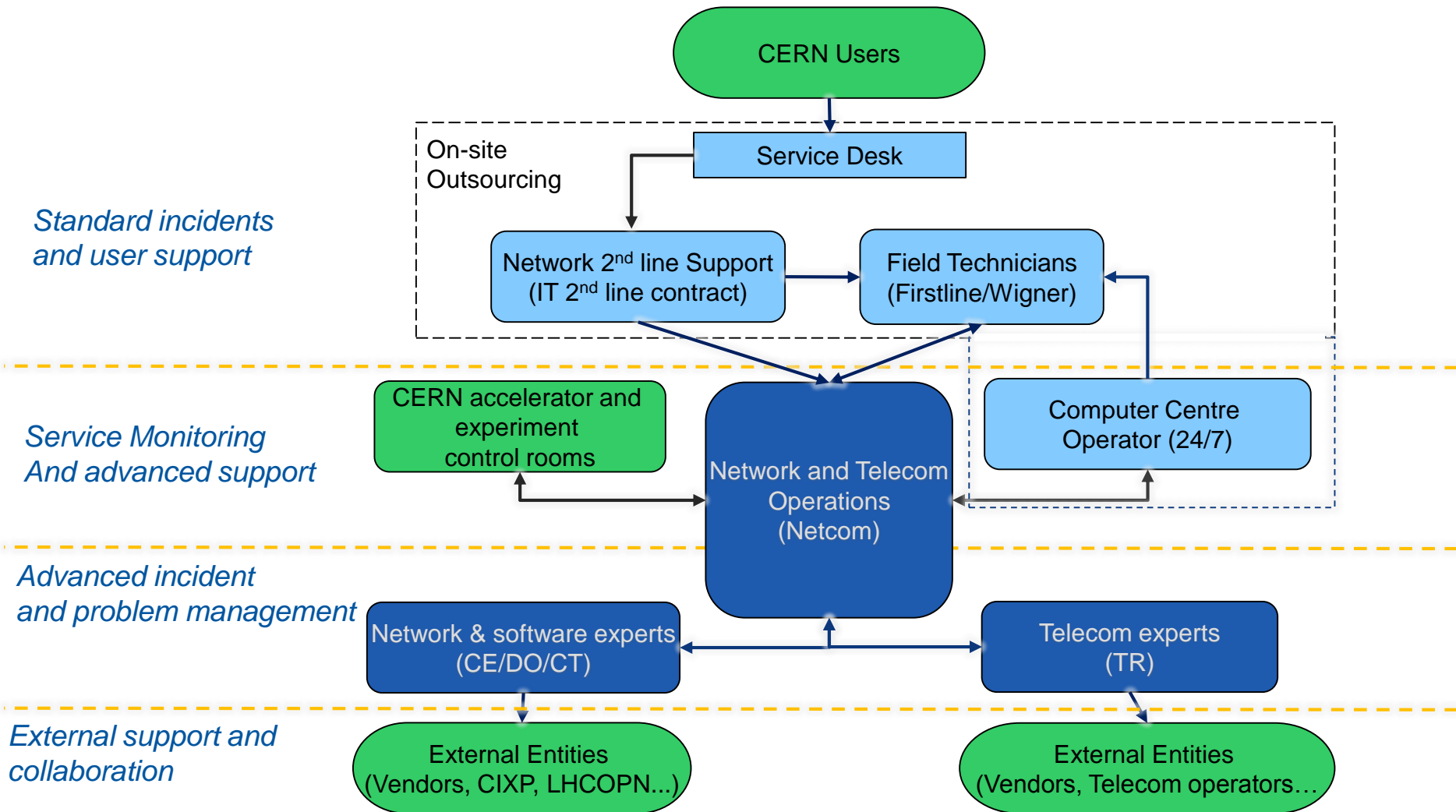


Introduction to Network Operations at CERN

Gyorgy Balazs
Veronique Lefebure

04.12.2018

NOC Structure (Network and Telecom incident management)

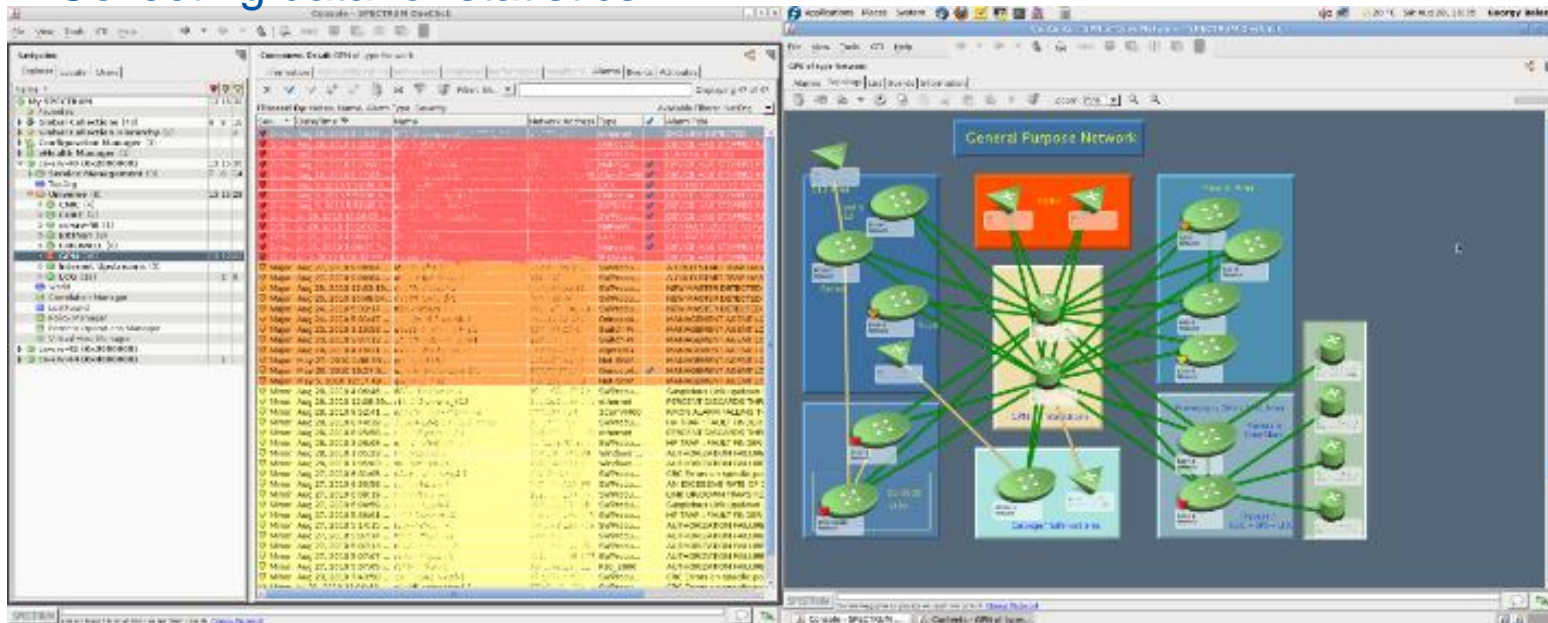


Infrastructure Monitoring

Monitoring tool: CA Spectrum fed by the in-house developed NMS

Used for:

- Monitoring network & telecom devices and related servers, PDUs, temperature sensors, selected hosts for experiment instruments
- Tracking alarms and sending notifications
- Collecting data for statistics



Service Management / Ticketing

Integrated ITSM tool: Service-Now

Used for:

- User incidents and requests
- Intra-NOC ticketing (between group entities)
- Knowledge base
- Change management
- Intervention planning
- Service catalogue and portal
- Service status board
- OWH support calendars
- Reporting (eg. SLA tracking)

ID	Name	Priority	Status	Assignee
INC01901	Stéphane Akiane Akiane	1 - Major Incident	Resolved	GU Service Management Support
INC01902	Sarah Malin Archer	1 - Major Incident	Resolved	EDMS 2nd Line Support
INC01903	Malcolm Lambertson	1 - Major Incident	Assigned	EDMS 2nd Line Support
INC01904	Barbara Louise Ingham	1 - Major Incident	Closed	Workshop Support 2nd Line Support
INC01905	Claude Ducaud	2 - High	Waiting for user	Steel Structures 2nd Line Support
INC01906	Christine Tins	2 - High	Assigned	Safety Equipment 2nd Line Support
INC01907	David Michel Yves Chabard	2 - High	In progress	Medical equipment 2nd Line Support
INC01908	Suzanne Fontana	2 - High	In progress	ITVAD 2nd Line Support
INC01909	[Redacted]	3 - Moderate	Resolved	GU Service Management Support
INC01910	Alison Dore	3 - Moderate	In progress	Checkups 2nd Line Support
INC01911	Christine Tins	3 - Moderate	Assigned	Health and Safety 2nd Line Support
INC01912	Christine Tins	3 - Moderate	Assigned	Workshop Desktop 2nd Line Support
INC01913	Suzanne Fontana	3 - Moderate	In progress	Process Management & Reporting 2nd Line Support
INC01914	David Michel Yves Chabard	4 - Low	Assigned	Physics 1st Line Support 2nd Line Support
INC01915	Alison Dore	4 - Low	Resolved	Spreadsheets

CA Spectrum → Service-Now integration

- For selected alarms:
 - Use of our CERN-IT GNI = General Notification Infrastructure
 - Message sent by a Spectrum daemon to create a S-Now ticket on the desired support level
 - Reading back S-Now Ticket number to link it to the Spectrum alarm
- Improves alarm follow up
 - Includes link to targeted alarm procedures
 - Includes link to alarm history
- Allows problem analysis

Alarm history (home-made)

IT/CS Alarm History

Month
 Severity
 Class
 Type
 Alarm Name
 Device Name (Or Pattern)

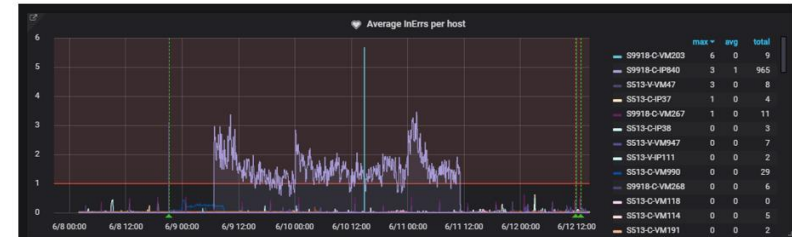
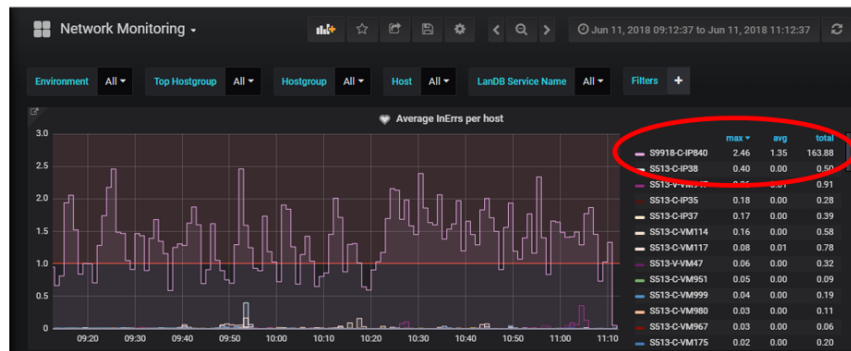
Found 13 alarms

SEVERITY	OCC	DEVICE NAME	TYPE	CLASS	ALARM NAME	ACK	START AT	CLEARED AT	COMMENT	TROUBLE ID
MINOR	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	Device has rebooted	NO	03-12-2018 11:55:45			
MINOR	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	HP switch reboot due to Power Failure	NO	03-12-2018 11:55:22			
MAJOR	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	A COLD START TRAP HAS BEEN RECEIVED	NO	03-12-2018 11:55:22			
CRITICAL	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	DEVICE HAS STOPPED RESPONDING TO POLLS	NO	03-12-2018 11:54:02	03-12-2018 11:55:14		
CRITICAL	1	u2395-r-prz-shp3m-2	HPProCurve	Switch	DEVICE HAS STOPPED RESPONDING TO POLLS	NO	03-12-2018 11:51:46	03-12-2018 11:54:37		
MINOR	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	Device has rebooted	NO	03-12-2018 10:08:32	03-12-2018 11:55:22		
MINOR	1	u2395-r-pb14-bhp46-1	HP_Wireless	Wireless	Device has rebooted	NO	03-12-2018 10:08:32			
MINOR	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	HP switch reboot due to Power Failure	NO	03-12-2018 10:08:08			
MINOR	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	HP Trap	NO	03-12-2018 10:08:08			
MAJOR	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	A COLD START TRAP HAS BEEN RECEIVED	NO	03-12-2018 10:08:08			
MINOR	1	u2395-r-prz-shp3m-2	HPProCurve	Switch	Device has rebooted	NO	03-12-2018 10:07:50			
CRITICAL	1	u2395-r-prz-shp1s-1	HPProCurve	Switch	DEVICE HAS STOPPED RESPONDING TO POLLS	NO	03-12-2018 10:07:07	03-12-2018 10:08:02		INC1855807
CRITICAL	1	u2395-r-prz-shp3m-2	HPProCurve	Switch	DEVICE HAS STOPPED RESPONDING TO POLLS	NO	03-12-2018 10:04:53	03-12-2018 10:07:21		INC1855799

End-server Collectd monitoring

- May help to identify quickly the source of a problem

INC1703756 “HIGH SEVERITY - Networking packet corruption?” – no Spectrum Alarm

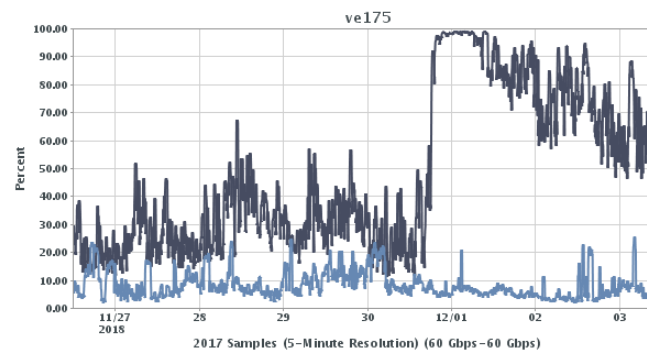
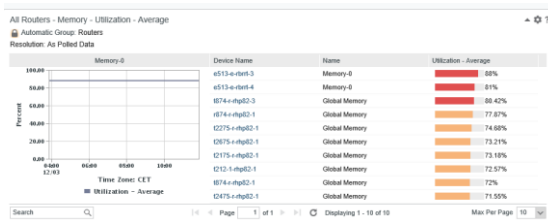
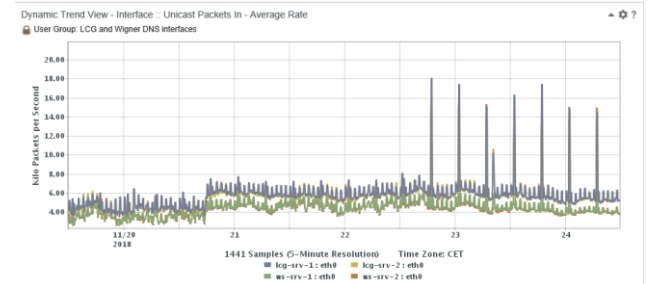
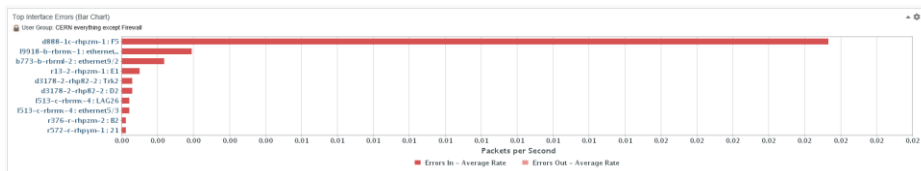


When the problem started (Saturday)

When it got fixed

CA Performance Manager

- Poll device MIBs
- history storage, more flexible than rrd files
- Easy setup of dashboards



Incident management responsibilities

- **Netcom (working hours):**
 - Non critical alarms on all IT/CS services that require attention (Orange alarms) – (4 hours)
 - Post mortem analysis of transient (<10 min) critical alarms (4 hours)
 - Non critical incidents on experiment equipment forwarded via tickets by the experiments and owners of private networks
- **CC operators (24/7)**
 - Critical alarms (15 minutes)
 - Critical incidents on experiment equipment forwarded via telephone + email by the experiments
 - Forward transient alarms to Netcom, active alarms to Firstline/Wigner
- **Firstline (24/7)**
 - Treat on incidents created by the CC Operator, Netcom or by users via the IT 2nd line
- **Wigner (working hours)**
 - Treat on incidents created by the CC Operator and Netcom

Netcom Responsibilities:

- 3rd line support for all the group's services
- Treat orange alarms, supervise interventions on critical alarms
- Post mortem analysis of intermittent alarms
- Supervise 2nd line support, outsource low value added tasks, maintain their procedures
- Coordinate the group's and the Fircline's interventions
- Monitor the operation of network services (DHCP, NTP, ACL, DNS)
- Spectrum backup responsible
- Identification and follow-up of long-term problems
- Run Netcom, CSOP, IT2nd line, TOM meetings, attend NCM, C5, TIOC
- Keep netcom documentation up to date (procedures, knowledge base)

Teleng (CS) responsibilities

- 4th line Telecom support (in reality 3rd line)
- Follow up cases with vendors' support
- Monitor the operation of advanced telecom services
- Run Telecom meeting, attend TOM, CSOP
- Teleng makes sure escalated tickets are being treated with reasonable delay
- Maintain operational documentation of services (create/review 1 procedure per week)

Neteng (CE) Responsibilities

- 4th line Network support
- External network operations
- Testing and deployment of new firmware releases
- Follow up cases with vendors' support
- CIXP support to users and tools (remote hands, looking glass, Akamai, RIPE)
- Deployment of CC services
- Lab housekeeping
- Monitor the operation of network services (DHCP, NTP, ACL, DNS)
- Run NCM meeting, attend CSOP
- No Neteng rota today, operational activities rely on engineers' initiatives