



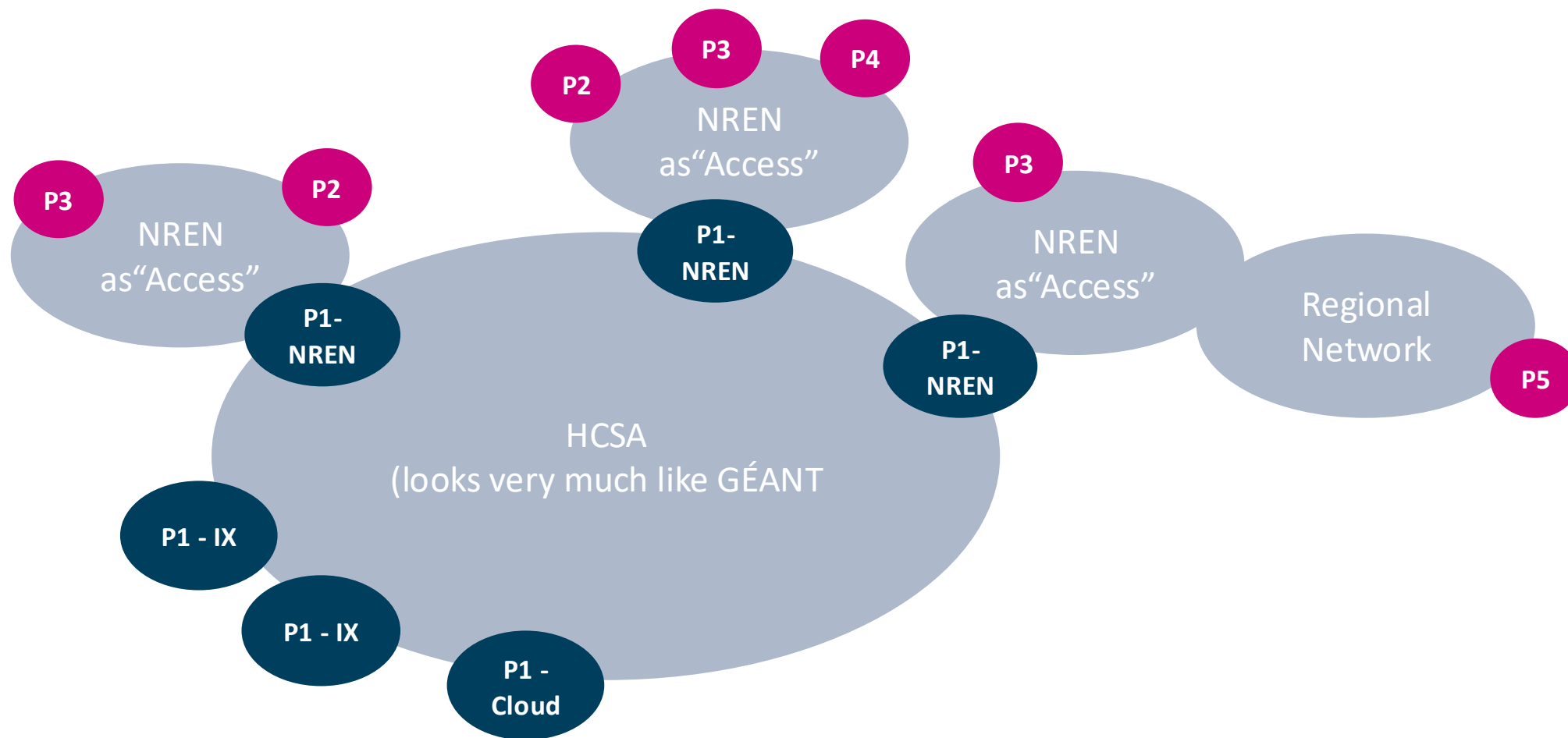
Multi-domain communication between teams on the EuroHPC Network

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SIG-NOC

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Confidential



Service Area and Access – Points of Interest

- **Priority 1:**

- All NREN connections, IXes, “Cloud parties”
- **This is the HCSA – this maps onto GÉANT + NREN interconnections**

- **Priority 2:**

- **Main EuroHPC sites** – connect to HCSA via NRENs
- Mandatory connection

- **P3/P4 - P5/P6:**

- P3/P4 – still mandatory connection – typical NREN connected sites
- P5/P6 - range of sites, quality parameter how much we can connect

Terminology

- HCSA – Hyperconnectivity Service Area, GEANT Backbone, NREN APs, IXes and Cloud Providers.
- Access network – NREN (or direct) downstream interfaces to Pols.
- Pols – Points of Interest
 - Priority 1: Hyperconnectivity Service Area (HCSA).
 - Priority 2: EuroHPC hosting sites, including the planned ones.
 - Priority 3: Major European and national HPC centres and data providers from which HPC users retrieve their data, making them of vital importance.
 - Priority 4: Other important national HPC centres and data providers.
 - Priority 5: Small-scale national or regional HPC centres and data providers.
 - Priority 6: Other smaller-scale national or regional HPC centres and data providers.



Where we are now

- HLD production – complete, triggers first payment
- In LLD production now, which includes systems and processes
- Next 6 months – deliver HCSA (mid September 2026)
 - GÉANT core
 - NREN Access Ports
 - IXes
 - Cloud Providers
 - 1 x P2, 1 x P3, 1 x P4 (identified and working with NRENs)
- Demonstrate SLAs, systems and process functionality
- This triggers a further payment
- Other payments as and when Pols are onboarded

Pre-Implementation Study

- Sent to each PoI by the NREN (the PoI remains the NREN customer)
- Key points:
 - Assessment of the current status
 - Delivery of the required capacity
 - Access profile transition
 - CPE
 - Performance monitoring probe
 - Needs to be complete 4 weeks prior to joining the HCSA

Incident Flow – some ground rules

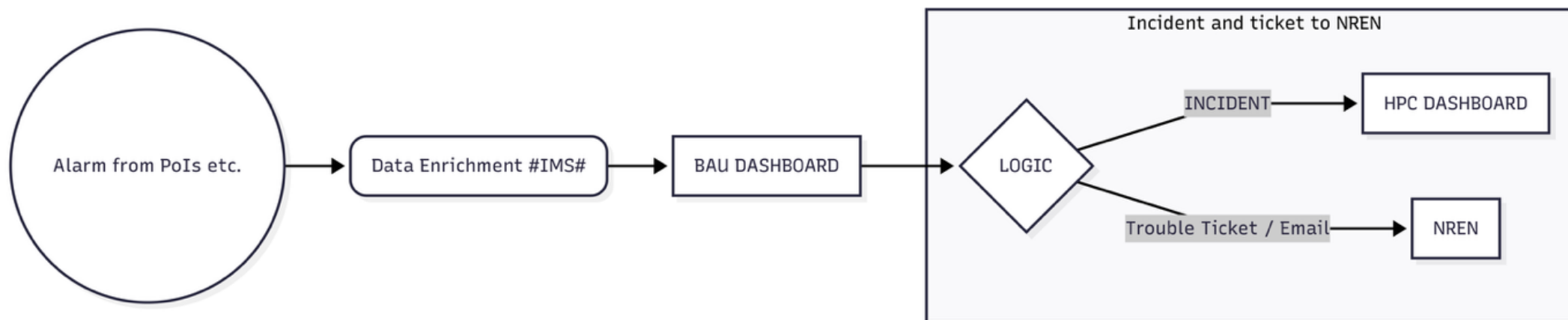
- NREN Access Ports are treated as BAU*
- IXes, Cloud providers are treated as BAU*
- Poles are new (for GEANT) and have so have some special rules
 - Port closest to the Pole is polled by GEANT using SNMP, Streaming Telemetry or another method – HCSA NRENs seem to like Prometheus which works by periodically "scraping" or pulling numerical metrics from your streaming telemetry endpoints via HTTP <https://prometheus.io/>
 - This is so we have a view of ALL incidents affecting the HCSA*
 - Communication is largely automated
- Poles for the NREN are largely BAU
 - Poles remain customers of the NREN
 - Communication with the Pole comes from the NREN
 - Fault fix remains with the NREN

Incident Management Environment

- The hyperconnectivity provider is required to provide a comprehensive incident management environment where PoI's technical teams, Service Managers, EuroHPC JU representatives, or other authorised personnel can report, escalate, and close network incidents. This service must offer a unified user interface (UI) that presents incidents in a stacked row format, allowing users to easily track the status and progression of each incident. The system must facilitate clear communication and efficient management of incidents, ensuring that issues are resolved promptly and transparently. This structured approach to incident management is crucial for maintaining network reliability and user satisfaction.



Incident Flow



Inventory Management System (IMS)

IMS

Object Reminder Nni Open Circuit SPOF Find All Related Open Circuit Path Export Put circuit to 'In Focus' Reconcile Re-Calculate Sequence Numbers Duplicate Change Status Split Merge Tooltip Info Copy New Delete Close Form

Home x Circuits x

Search

ACONET-P1-RE

Search Text:

Details: Circuit

Name : ACONET-P1-RE
Speed.Name : ETHS
CircuitTypeId : BT
SiteA.Name : VIENNA
SiteB.Name : VIENNA
Customer.Name : ACONET
Customer.FullName : ACONET
Product.Name : GEANT IP
ServiceParts : NOKIA
Vendor.Name : NOKIA

Details: Site

SiteA.Name : VIENNA
SiteA.City.Country.Name : AUSTRIA
SiteA.City.Name : VIENNA
SiteA.Street : LOUIS-HÄFLIGER-GASSE
SiteA.HouseNumber : 10
SiteA.Customer.Name : GEANT
SiteA.Customer.FullName : GEANT ASSOCIATION B.V.
SiteA.PhoneNumber : +43 1 290 36 36 - 31
SiteB.Name : VIENNA
SiteB.City.Country.Name : AUSTRIA
SiteB.City.Name : VIENNA
SiteB.Street : LOUIS-HÄFLIGER-GASSE
SiteB.HouseNumber : 10
SiteB.Customer.Name : GEANT
SiteB.Customer.FullName : GEANT ASSOCIATION B.V.
SiteB.PhoneNumber : +43 1 290 36 36 - 31

ACONET-P1-RE (IS)

Carriers (1) Sub Circuits (2) Details History (9) History Sub (2) Same Route Reconcile NmsId Geo Map Extra Details ALL CARRIERS Related Services Customer Contacts Vendor Contacts Repair Contacts

Monitored In Geant Nms:
 Physical Capacity (Gbps):
 Available Capacity (Gbps):
 Third Party Circuit Id:
 Service Id (S I D): GS-00422
 Service Request Form (Srf) Id:
 Gcs Id:
 Monitored In Eurohpc Hcsa Nms?:

Document Url:
 Contract Db Url: [HTTPS://GEANT.APR.BOX.COM/FILE/69927311849?S=090CQOBVN96RU2MKH4TKIKPMEEI46V58](https://geant.apr.box.com/file/69927311849?S=090CQOBVN96RU2MKH4TKIKPMEEI46V58)
 Notes:

Internal Ports VmRelateInternalPorts (1)


#	Site Name	Node Name	Shelf Name	FullPortName	IpAddresses	Circuit Name	SequenceN...	Circuit Inven...	ProjectStatus	PortStatus	ProjectNumber	InternalPort...	InternalPort...	Comments	De
	● VIENNA	● RT0.VIE.AT		LAG-21.51	62.40.124.1	● ACONET-P1-...		1 IS	ACTUAL_AND_...					SRV_GLOBAL C... NO	

Dashboard (ARGUS)

GÉANT									
Filters ▾ Blacklists ▾ Preferences Short-Lived Alarms						Screen last refreshed 9 seconds ago Trap last correlated less than 30 seconds ago Inventory last updated 15/01/25 11:36:59		Collector <input type="checkbox"/> Classifier <input type="checkbox"/> Correlator <input type="checkbox"/> Inventory Provider <input type="checkbox"/>	
(1 of 1) 1 100 ▾									
Trap Date (UTC)	#	Location	Equipment	Alarm Description	TT	SD	NCC	Comment	
Tue, 13:37 1 day	1	NGT-SOM - PARIS	NGT-SOM-MTC9-1 PAR01-MTC6-1	LON2-PAR-DFROUTE Incident (GEN2-LON1-EEX-ESNET-2373-2-400G, GEN2-LON1-ESNET-24015-2-400G, LON2-PAR-IPTRUNK)	000844	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Tue, 13:37 1 day	1	PARIS	MX1.PAR.FR	AMS-GEN-GRID5000-RENATER-SINET-07201, AMS-PAR-GEANTOPEN-NORDUNET-INTERNET2-17008, CANARIE-PAR-LHCONE, ESNET-PAR-LHCONE, FR-CANARIE-VLAN...	000826	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Tue, 09:23 21 hours 3 mins	2	LONDON 2	MX1.LON2.UK	BGP peering, UK-MARWAN (2001:0798:0099:0001:0000:0000:0000:0066, 62.40.125.33) Incident	000219	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
29/12/24 11:18 2 weeks 3 days	1	MARSEILLE	RT1.MAR.FR	CSTNET-MAR-LHCONE-PRIMARY, FR-HARNET, FR-IC1-CSTNET-PRIMARY, FR-IC1-CSTNET-QUINARY, FR-IC1-SINGAREN, GEN-MAR-IHEP-CERN-CSTNET (interfac...	000128	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
26/12/24 14:02 2 weeks 6 days	1	AMSTERDAM	RT1.AMS.NL	BGP peering, NL-HARNET (2001:0798:0099:0001:0000:0000:0000:0076, 62.40.125.35) Incident	000179	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
26/12/24 14:02 2 weeks 6 days	1	MARSEILLE	RT1.MAR.FR	BGP peering, FR-HARNET (2001:0798:0099:0001:0000:0000:0000:00a2, 62.40.125.37) Incident	000161	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Mon, 18:20 1 day 6 hours	5	AMSTERDAM	RT1.AMS.NL	One or more IX peering down on rt1.ams.nl.geant.net affecting LeaseWeb		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Thu, 15:17 5 days 23 hours	1	MADRID	MX1.MAD.ES	One or more IX peering down on mx1.mad.es.geant.net affecting G-Core_Labs		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
27/09/24 19:13 15 weeks 4 days	1	FRANKFURT 15	RT1.FRA.DE	One or more IX peering down on rt1.fra.de.geant.net affecting Microsoft	000822	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:57 36 mins 17 secs	1	LONDON 2	RT0.LON2.UK	Interface 2/1/c16/4 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:56 37 mins 3 secs	1	LONDON 2	RT0.LON2.UK	Interface 2/1/c16/3 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:55 37 mins 30 secs	1	LONDON 2	RT0.LON2.UK	Interface 2/1/c16/2 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:55 37 mins 59 secs	1	LONDON 2	RT0.LON2.UK	Interface 2/1/c16/1 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:55 38 mins 24 secs	1	LONDON 2	RT0.LON2.UK	Interface 2/1/c14/4 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:54 38 mins 53 secs	1	LONDON 2	RT0.LON2.UK	Interface 2/1/c14/3 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:54 39 mins 20 secs	1	LONDON 2	RT0.LON2.UK	Interface 2/1/c14/2 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:53 39 mins 46 secs	1	LONDON 2	RT0.LON2.UK	Interface 2/1/c14/1 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
13:52 40 mins 57 secs	1	LONDON 2	RT0.LON2.UK	Interface 1/1/c22/1 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
14:35 23 hours 57 mins	1	BRUSSELS	RT2.BRU.BE	Interface et-0/0/1.0 Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Tue, 13:37 1 day	1	LONDON 2	LON02-GRV3	Loss of Optical Service (LON02-GRV3 1/2.3)		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Tue, 13:37 1 day	1	AMSTERDAM	AMS01-GRV2	Loss of Optical Service (AMS01-GRV2 1/1.3)		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Tue, 13:37 1 day	1	PARIS	PAR01-GRV3	Loss of Optical Service (PAR01-GRV3 1/3.1)		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Tue, 10:13 1 day 4 hours	1	lon	rt0.lon.uk	BGP peering (62.40.96.39) Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>
Tue, 10:13 1 day 4 hours	1	LONDON	RT0.LON.UK	BGP peering rt0.lon.uk.geant.net (62.40.96.21) Incident		<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/>



Incident Management Environment


GÉANT NETWORK SERVICES

Current Incidents | Planned Maintenance

All Open Incidents | Resolved Incidents

CURRENT INCIDENTS ON THE GEANT NETWORK

Search for services..

NUMBER OF TICKETS: 9

REFRESH IN 87 SECS | 14/01/2025, 14:41:10 | SCREEN LAST REFRESHED 33 SECS

TICKET NUMBER	TICKET TITLE	TICKET TYPE	STATE	HIGHEST PRIORITY REACHED	SERVICES AFFECTED	TICKET CREATE TIME (UTC)	EVENT START TIME (UTC)	EVENT END TIME (UTC)
1	2025011434000826 [par] NYC-PAR LAG, Incident	Incident	open	2	__GEANT PLUS__ AMS-GEN-MORE INFO	2025-01-14 13:39:19	2025-01-14 13:37:00	
2	2025011434000844 [lon2-par] LON2-PAR-DFROUTE, Incident	Incident	open	2	__GEANT MANAGED WAVELENG MORE INFO	2025-01-14 13:39:39	2025-01-14 13:37:00	
3	2025011434000764 [zag] MARNET-AP2-LAG, Incident	Incident	responded	2	__GEANT IP__ MARNET-AP2 MORE INFO	2025-01-14 13:15:05	2025-01-14 13:13:00	
4	2025011434000755 [ath2,mil2, the] CRO-MIL2-LEASED SPECTRUM-001, Incident	Incident	open	2	__IP TRUNK__ MIL2-THE-I MORE INFO	2025-01-14 13:12:40	2025-01-14 13:10:00	
5	2025011434000835 [lon] LON-BEIJING-LEASEDSPAN, Incident	Incident	open	2	__L3-VPN__ CSTNET-LON-L MORE INFO	2025-01-14 13:39:31	2025-01-14 13:37:00	
6	2025011434000219 [lon2] UK-MARWAN, Incident	Incident	open	2	__IP PEERING - R&E__ UK MORE INFO	2025-01-14 09:25:20	2025-01-14 09:23:00	
7	2024122634000179 [ams] NL-HARNET, Incident	Incident	open	2	__IP PEERING - R&E__ NL MORE INFO	2024-12-26 14:04:59	2024-12-26 14:02:00	
8	2024122934000128 [mar] FR-ICT-LAG, Incident	Incident	open	2	__IP PEERING - R&E__ FR MORE INFO	2024-12-29 11:20:39	2024-12-29 11:18:00	
9	2024122634000161 [mar] FR-HARNET, Incident	Incident	open	2	__IP PEERING - R&E__ FR MORE INFO	2024-12-26 14:04:48	2024-12-26 14:02:00	



EuroHPC Incident Management Dashboard

GEANT HPC Dashboard

admin Admin Impersonation Network Connections Logout

ID	Title	Type	State	Created	Start	End
2026031934000811	BGP peering, REDCLARA-PAR-LHCONE (2001.0788.0111.0001.0000.0000.0000.0022, 62.40.126.174) Incident	Incident	open	1773932823	1773932823	
2026031934000812	Scheduled maintenance on GEANT backbone in DE region	Maintenance	planned	1773932900	1773936500	1773940100

GEANT GEANT HPC Dashboard Signed in as admin Ticket Dashboard Network Connections NREN Preview Admin Logout

Network Connections

Active NREN: FCCN (Portugal)


Admin preview mode is active for this NREN. Current mode: **read-write**. [Change selection](#) or [clear preview](#) . [switch to read-only](#)

NREN users can create, edit, and delete network connection entries for their own NREN.

Sites and connections Add Site

- FCT NOVA — 2 connections
 + Connection Edit Delete
- INESC-ID — 2 connections
 + Connection Edit Delete

EuroHPC Incident Management Dashboard


GEANT HPC Dashboard
Signed in as admin
Ticket Dashboard
Network Connections
NREN Preview
Admin
Logout

Network Connections

Active NREN: FCCN (Portugal)

Admin preview mode is active for this NREN. Current mode: **read-write**. [Change selection](#) or [clear preview](#) . [switch to read-only](#)

NREN users can create, edit, and delete network connection entries for their own NREN.

Sites and connections Add Site

^ **FCT NOVA** — 2 connections + Connection Edit Delete

Link host	Interface	Peering host	IPv4 peer	IPv6 peer	Comment	Actions
ge1.fccn.pt	HundredGigE0/10/7.81	-	193.136.1.174	2001:690:810:3::2	-	Edit Delete
ge31.fccn.pt	TenGigE0/0/0/2.86	-	193.136.1.182	2001:690:810:53::2	-	Edit Delete

- **INESC-ID** — 2 connections + Connection Edit Delete

Link host	Interface	Peering host	IPv4 peer	IPv6 peer	Comment	Actions
ge53.fccn.pt	TenGigE0/0.802	-	194.210.4.158	-	no telemetry - will be migrated soon	Edit Delete
ge33.fccn.pt	Bundle-e3101.702	-	194.210.4.190	-	no telemetry - will be migrated soon	Edit Delete

Incident Management continued

- NRENs will have a view of this dashboard so they can see all events as well as self-serve to add / change Pols – Please do also tell us when something changes so we can make sure it works
- When an incident occurs with a Pol GEANT ‘should’ see this and automatically open a ticket and send it to the affected NREN, so please check the portal first for a ticket and if none is there please open a ticket with the GEANT OC
- If an incident is occurring that is not a simple up/down please open a ticket with the GEANT OC – we can only see interface stats, interface status and BGP state – e.g. site reports degradation of service. Even though the NREN is typically the fix party ALL events need to be recorded.
- When reporting, please use the service ID we will assign to the Pol port and service



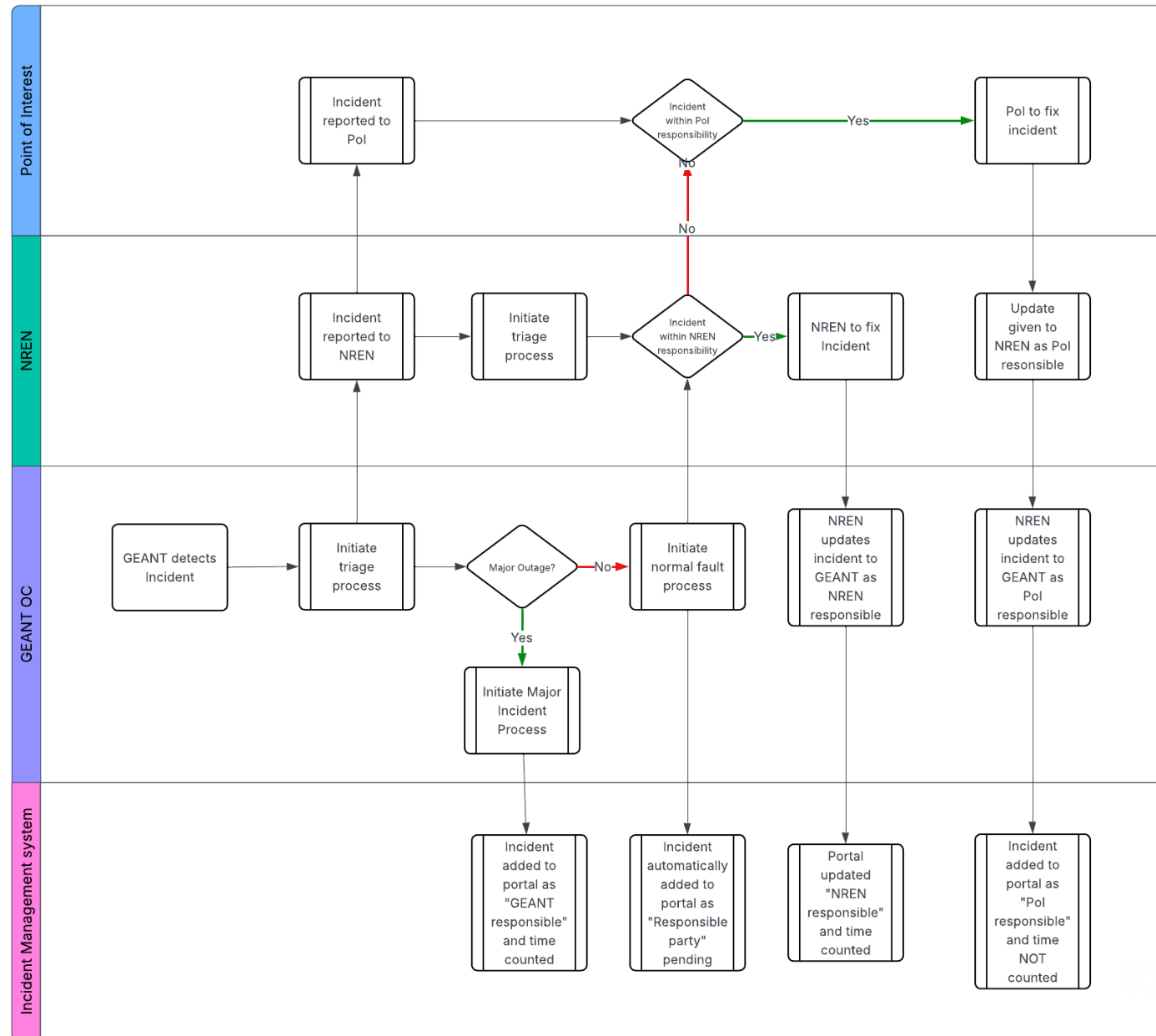
Service IDs

- All GEANT services currently have service IDs
- We have created a new service ID type for EuroHPC

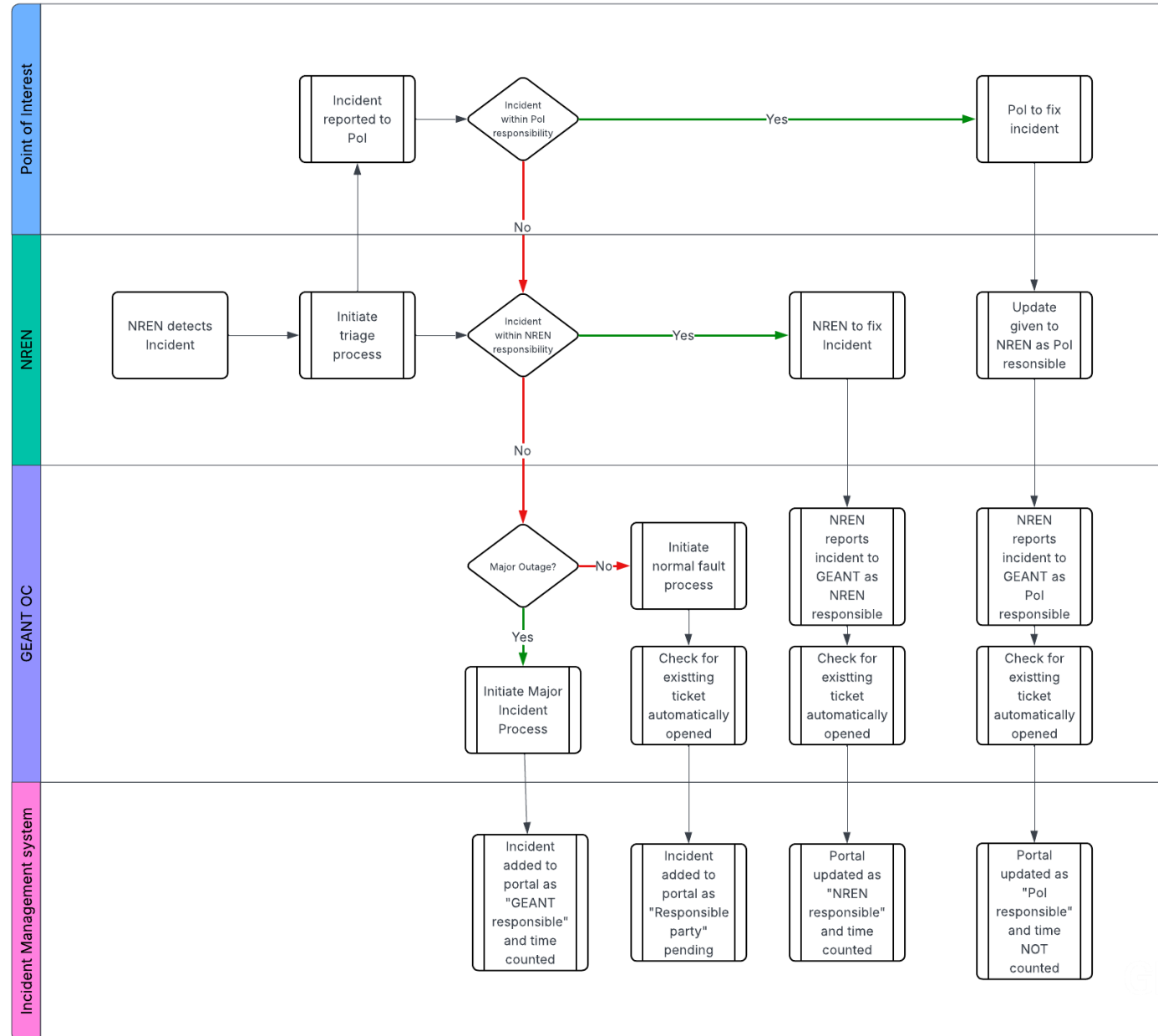
Infrastructure Type		Prefix	Number Format	Example
GÉANT	Port SID	GA	5 Digits	GA-01234
GÉANT	Service SID	GS	5 Digits	GS-01234
EuroHPC	Port SID (Pol)	EA	4 Digits	EA-1234
EuroHPC	Service SID(Pol)	ES	4 Digits	ES-1234

Example: a Pol with 2 x access ports will have 3 SIDs – 1 for each physical port and 1 for the service (e.g. BGP) that runs over it

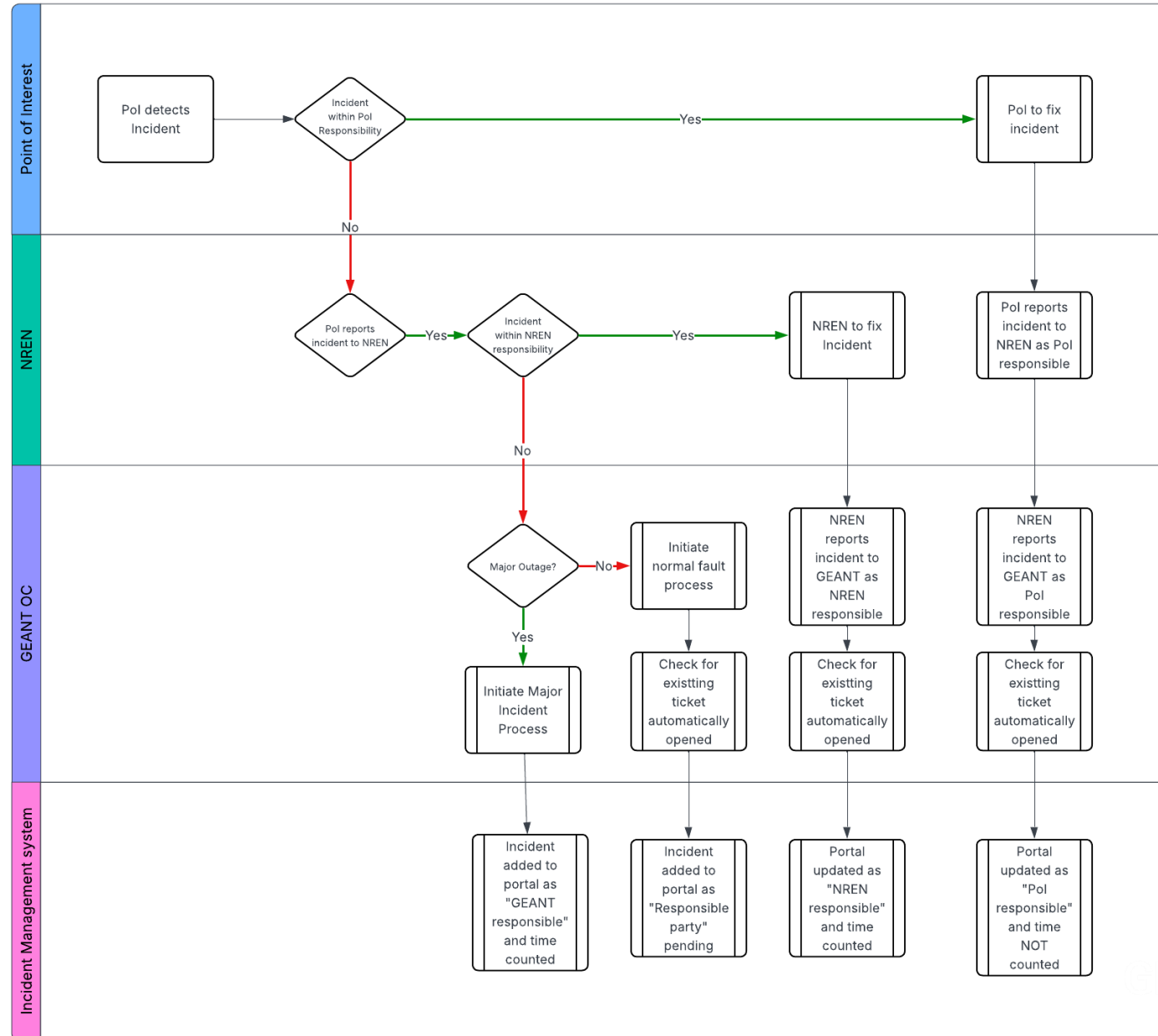
Process Flow 1 – GEANT Detects Incident



Process Flow 2 – NREN Detects Incident



Process Flow 3 – Customer Detects Incident



Other factors to consider

- Performance Management Platform
 - PerfSONAR, Telegraf
- Capacity Management
 - BAU
- Reporting
 - Quarterly and annually
- SLAs
 - Overleaf
- Service Manager
 - GEANT have a new service manager dedicated to EuroHPC - Joaquin

SLAs

Metric	Definition	Target / Threshold	Measurement Source
Access Port Availability	Percentage of uptime per PoI port (NREN)	≥ 99.9% uptime	SNMP/ST/API
Connectivity Availability	Network-wide uptime and user accessibility (HCSA)	≥ 99.99% uptime	SNMP / ST
Mean Time to Repair (MTTR)	Average duration to resolve an outage	≤ 4 hours	Incident Mgmt. System
Round Trip Time (RTT)	Delay between PoI and core PoPs (Paris, Frankfurt, Amsterdam, Milan)	≤ 60 ms	PMP
Local RTT	Delay from hosting site to local country node	≤ 15 ms	PMP
Packet Loss	Lost packets within HCSA	≤ 0.1%	PMP
Jitter	Variation in packet delay	≤ 5 ms	PMP
Backbone utilisation	Regular reports (quarterly) on backbone link utilisation must be provided, offering insights that aid in capacity planning and network optimisation.	60%	SNMP / ST

Next steps

- Low Level Design – in progress, this will form the basis of an ops manual
- Stats from all HCSA NRENs – Nearly there...
- Build services in IMS – in progress
- Test events in Dashboard and consequently...
- ...test tickets being raised and shown in the EuroHPC incident dashboard
- Start producing reports (wireframes ATT)
- Refine processes with GEANT OC and NRENs
- PMP / PerfSONAR work continues testing in lab and in London
- Get the HCSA accepted and payment
- Onboard sites (new Service Manager)
- Then on to BAU....



Thank You

Any questions?

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