

Grid'5000 network topology use cases

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- 1 Grid5000 overview
 - Presentation
 - Grid5000 general map
 - Grid5000 usage
 - Networking tools
 - User community
- 2 Grid5000 graphical network description
 - General view
 - Site view
 - Problems of this kind of representation
 - Users needs
 - Admin needs
- 3 Conclusion
- 4 More informations



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3 Conclusion

4 More informations

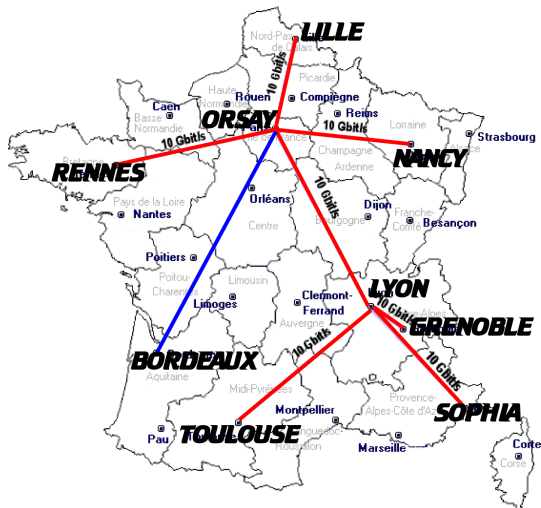


The main purpose of Grid'5000 is to serve as an experimental testbed for research in Grid Computing.

- Allow Grid experiments France wide in
 - Application
 - Programming Environment
 - Application runtime
 - Grid or P2P Middleware
 - Operating System
 - Networking
- 17 laboratories involved
- 9 sites hosting one or more cluster per site
- 500 to 1000 cpus per site
- 10Gb/s interconnection



Grid5000 general map

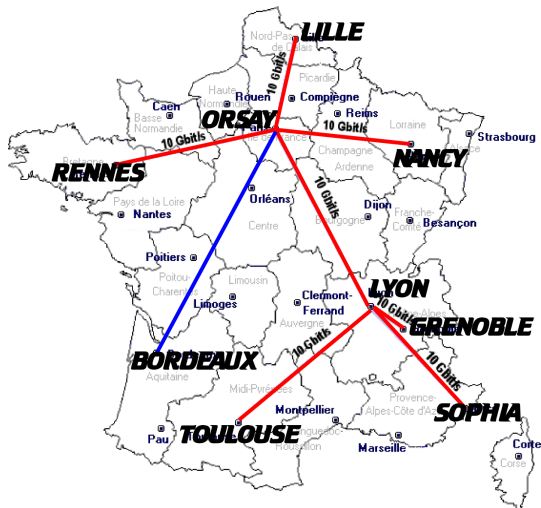


Overview

● 9 sites



Grid5000 general map

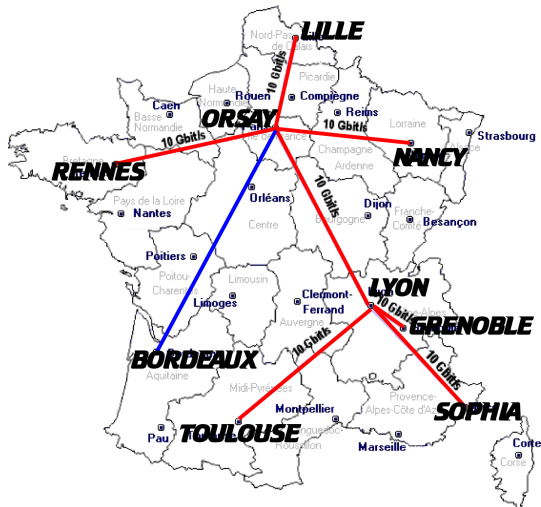


Overview

- 9 sites
- Backbone 10Gb/s : RENATER (national research and education network)



Grid5000 general map



Overview

- 9 sites
- Backbone 10Gb/s : RENATER (national research and education network)
- Dedicated VLAN on RENATER



The main particularity of Grid'5000 is the ability for users to deploy their own system on the resources they reserve.

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- Accurate reservation capability (CPU/Core/Switch reservation)
- Can be used with the kadeploy system



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Kadeploy

Environment deployment system

- Each user can make his own environment
- Total control of the reserved resources



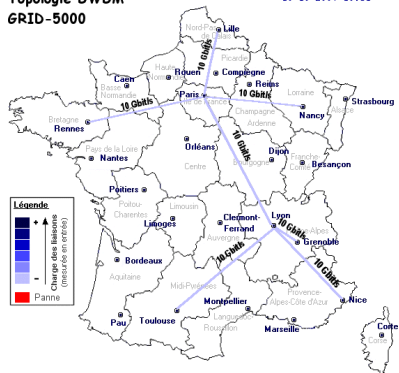
- RENATER Monitoring tools
- Grid5000 infrastructure description
- Nagios
- Ganglia
- SFlow (Only at Lyon)



Networking tools : Renater status

Topologie DWDM GRID-5000

10-10-2007 10:31



HISTORIQUE - PANNES

(Dernière mise à jour : 10-10-2007 10:31)

LIAISON	DATE	DEBUT	FIN
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(Dernière mise à jour : 10-10-2007 10:31)

LIAISON	Charge IN (Mbit/s)	Charge OUT (Mbit/s)	% Charge IN	% Charge OUT
Lambda_Rennes_Paris	47	48	0	0
Lambda_Lille_Paris	0.01	0.02	0	0
Lambda_Nancy_Paris	0.01	0.42	0	0
Lambda_Lyon_Paris	51	50	1	0
Lambda_Grenoble_Lyon	0.05	0.25	0	0
Lambda_Nice_Lyon	45	43	0	0

Historique des tickets d'incidents

(Dernière mise à jour : 10-10-2007 10:16, affichage des 100 derniers tickets)

Numero	Etat	Localisation	Elément	Date
1105956	Fermé	GAUELOUPE	-	2007-10

Historique des tickets de maintenances(M) et d'informations(I)

(Dernière mise à jour : 10-10-2007 10:16)

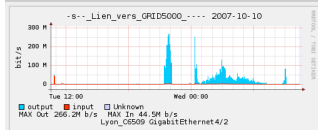
- 2 tickets planifiés aujourd'hui **en rouge**,
- 1 tickets planifiés demain **en orange**.



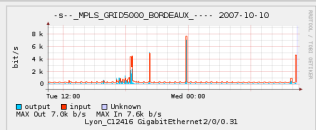
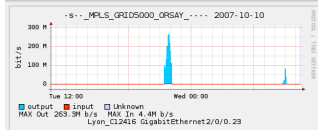
Networking tools : Renater SNMP stats

Lyon

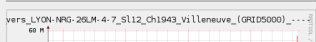
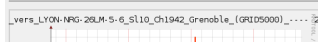
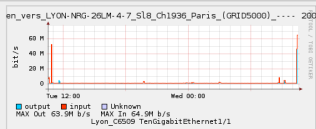
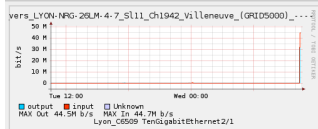
Dark fiber site interface:



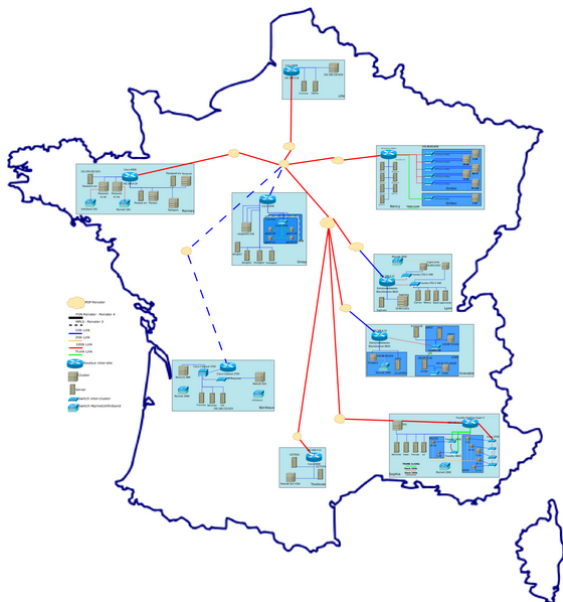
MPLS site interfaces:



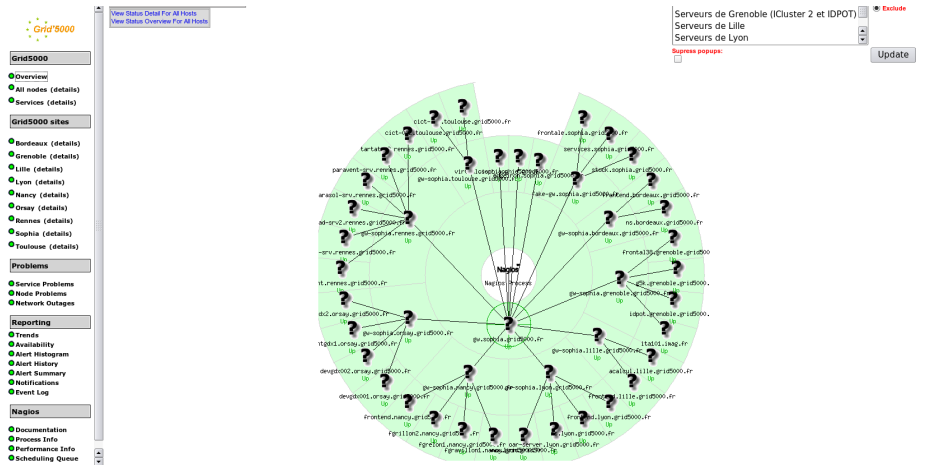
Backbone interfaces:



Networking tools : Grid5000 graphical network description



Networking tools : Grid5000 Nagios



Networking tools : Grid5000 Ganglia



Grid5000 Grid Report for Wed, 10 Oct 2007 10:56:40 +0200

Get Fresh Data

Last Sorted

Grid5000 Grid >

Grid5000 Grid (8 sources) [\(tree view\)](#)

CPUs Total: **2653**
Hosts up: **992**
Hosts unknown: **272**
Hosts down: **64**

Avg Load (15, 5, 1m):
23%, 26%, 27%
Localtime:
2007-10-10 10:56

Grenoble - ICluster2 [\(physical view\)](#)

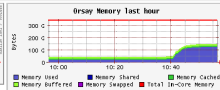
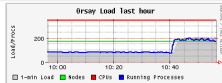
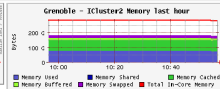
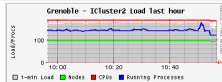
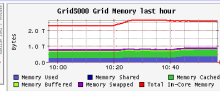
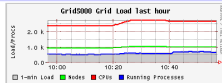
CPUs Total: **186**
Hosts up: **94**
Hosts unknown: **7**
Hosts down: **3**

Avg Load (15, 5, 1m):
82%, 82%, 83%
Localtime:
2007-10-10 10:56

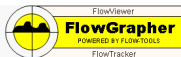
Orsay [\(physical view\)](#)

CPUs Total: **344**
Hosts up: **172**
Hosts unknown: **151**
Hosts down: **15**

Avg Load (15, 5, 1m):
34%, 57%, 60%
Localtime:
2007-10-10 10:56



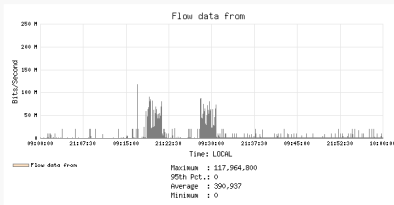
Networking tools : Grid5000 SFlow



Save as: 20071010_110502__graph.html

Report: Flow Graph
Start Time: June 6, 2007 9:00:00
Device:
Source:
Source Port:
Source I/F:
Source AS:
TOS Field:
Detail Lines: 20
Include if: Any part of flow in Time Period

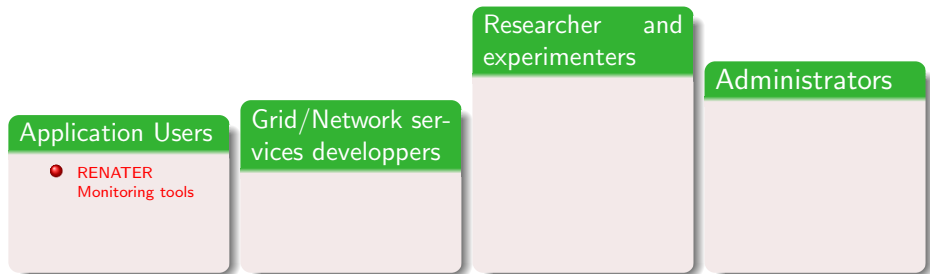
Sample Time: 5
End Time: June 10, 2007 10:00:00
Protocols:
Destination:
Destination Port:
Destination I/F:
Destination AS:
TCP Flag:
Graph Multiplier: 1



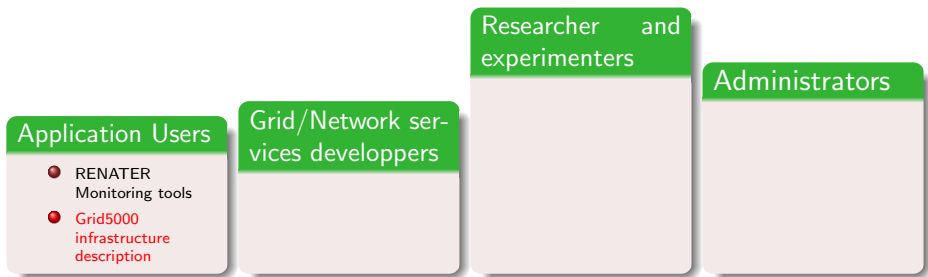
Start	End	Len	Source Host	Port	Destination Host	Port	Total Bytes	Mbps
15:08:00	15:08:00	1.0	129.88.70.61	636	10.69.7.225	49665	12,288,000	98.304

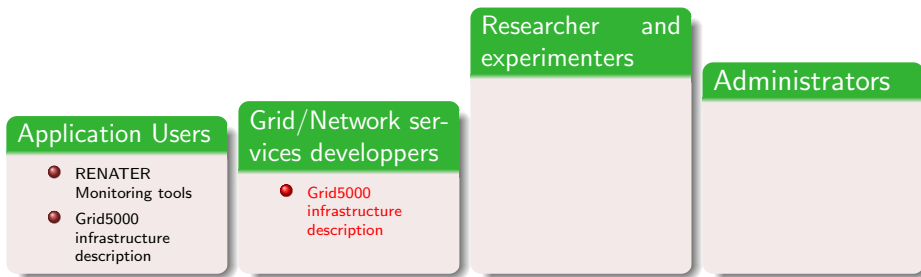


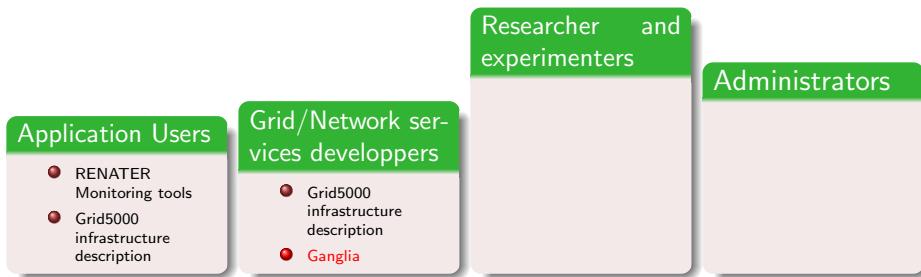
User community

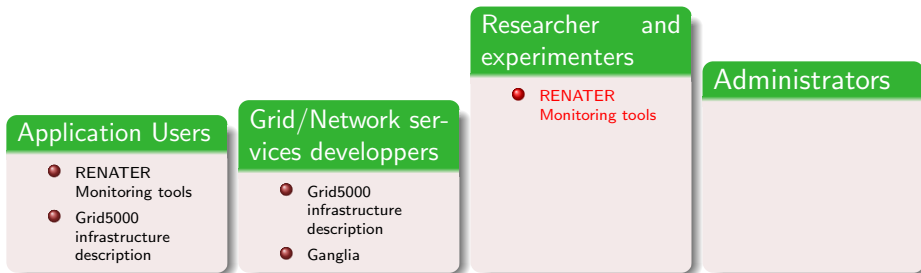


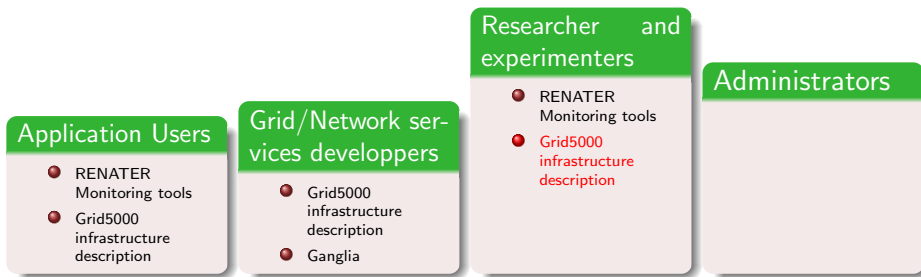
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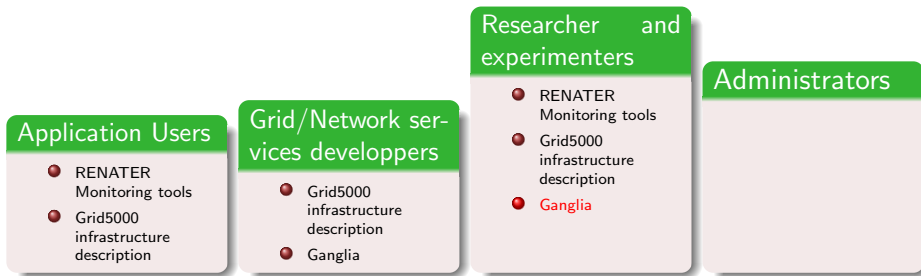


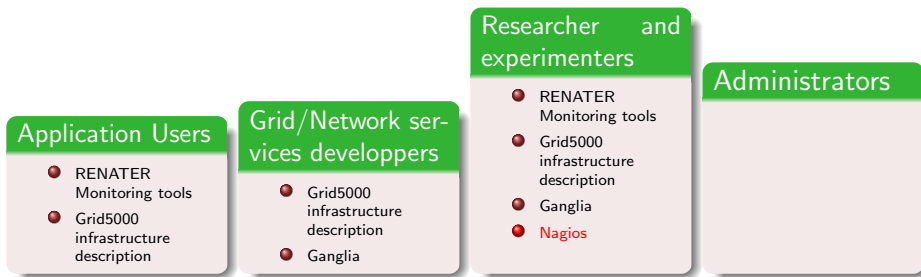


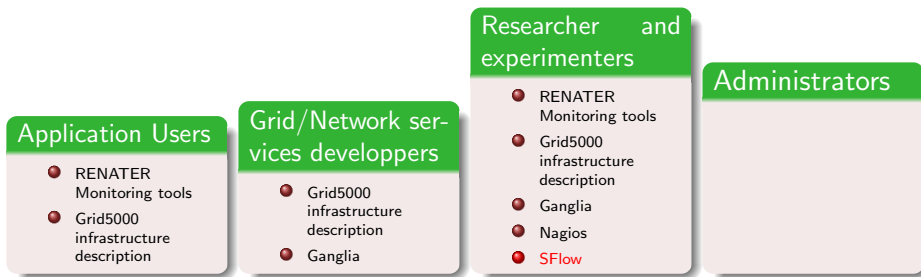












Application Users

- RENATER Monitoring tools
- Grid5000 infrastructure description

Grid/Network services developpers

- Grid5000 infrastructure description
- Ganglia

Researcher and experimenters

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- Nagios
- SFlow

Administrators

- RENATER Monitoring tools



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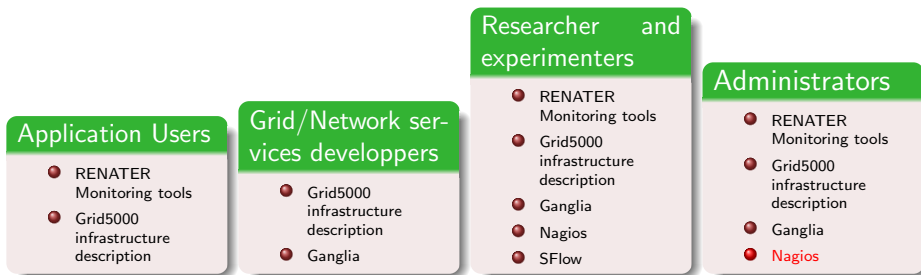
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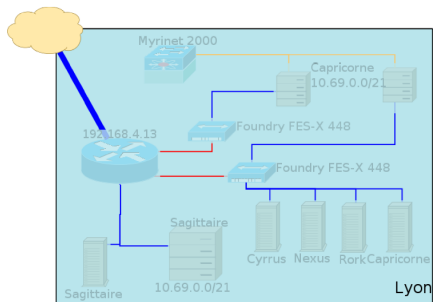
- RENATER Monitoring tools
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- **Ganglia**





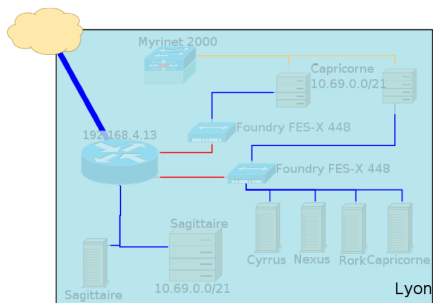
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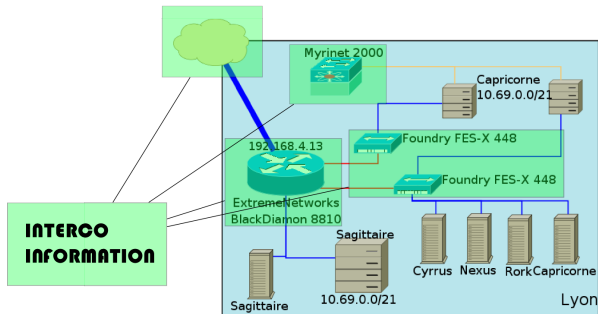
Provide

- Global links connexion



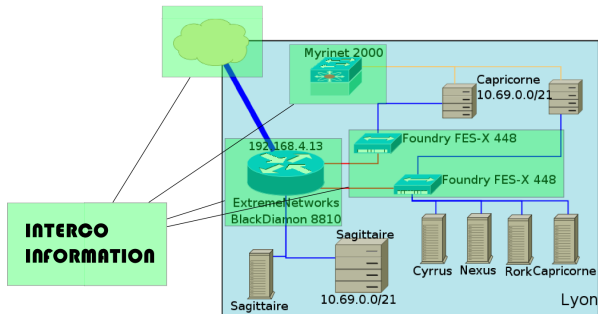
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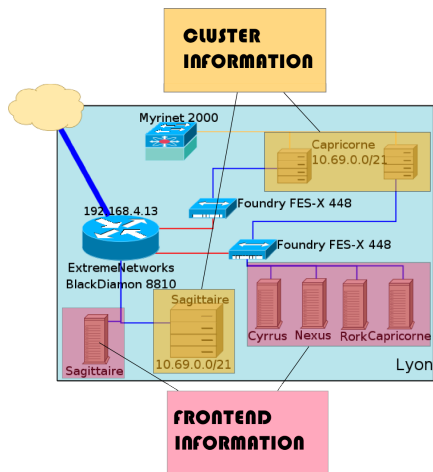
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 - Switch/Routeur type
 - Vendor name
 - Optional : IP address



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 - Vendor name
 - Optional : IP address
- Logical description
 - Nodes/Frontends name
 - Nodes network

Problems of this kind of representation

- Really static representation



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- Graphical based representation



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 - Can not show all information



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 - **Compatibility problems**



Problems of this kind of representation

- Really static representation
- Graphical based representation
 - Can not show all information
 - Compatibility problems
- Heavy synchronisation work



- Which devices they cross

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- Links status

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- **Oriented links**

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- **Multiview of the network**



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- Multiview of the network
 - **Hardware view**



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 - links capacity
 - links latency
- Multiview of the network
 - Hardware view
 - **Transport view**

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- Weight of edges
 - links capacity
 - links latency
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 - Hardware view
 - Transport view
 - **Application view (user space)**



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- Links status
- Oriented links
 - Bidirectional links
 - Unidirectional links
- Weight of edges
 - links capacity
 - links latency
- Multiview of the network
 - Hardware view
 - Transport view
 - Application view (user space)
- Filter the different information



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- Localisation of the resources
- Hardware representation
- Routing path
- Accurate scheme : All information about the hardware is interesting (router vendor, nodes type)
- Easy and dynamic representation describing hard/soft modification
- Ability to modify the informations in real time.

Admin and users

- Network graphical view
- Query tools

Conclusion

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Application developers and researcher

- API to directly access the network description



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Projects that need such of representation

- Bulk Data Transfer Service (BDTS)
- Virtualisation and Reconfiguration Service (SRV)
- HiperCal/HiperNet : Virtual Cluster/Virtual Network Overlay
- High Speed Transport To Service (HSTTS)



- Grid5000
<https://www.grid5000.fr>
- OAR
<http://oar.imag.fr>
- Kadeploy
<http://kdeploy.imag.fr>

