

The Discovery Project

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September 10, 2013

Next Generation Utility Computing ?

Current Trends

- Data centers of ever-increasing size
- High energy consumption
- Find new (colder) locations ?



But...

- Legal issues
- Reliability limitations
- **Long distance connections**

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Locality

A use case for locality

- Online ordering service
- Clients are locals
- Deployment in the 'ice cloud' ?
 - Extra energy consumed
 - Increased latency
 - Amount of network exchanges

Need for alternative designs

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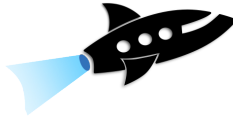
Need for alternative designs

Approaches

Beyond the cloud?

- Hybrid / Federated cloud?
- Micro Data centers at the edge of the network?
- Fog Computing?
- (Seasonal) data furnaces

The Discovery Initiative



Involvements

- PI : Adrien Lèbre (Ascola)
- Asap, Avalon, Myriads
- Orange
- Renater



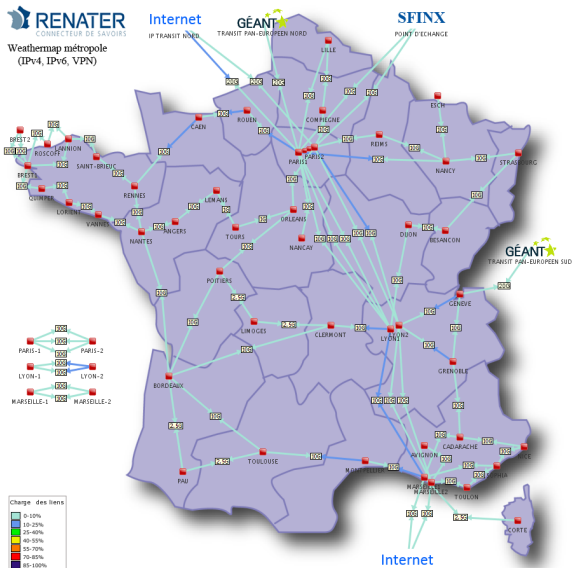
Orange Labs

The Discovery Initiative (2)



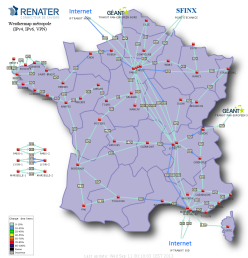
- One key idea : leverage the backbone's over-provisioning
 - Power
 - Cooling systems
 - Routers
- Room for adding resources directly in the backbone

The Renater Example



The Renater Example (2)

- Underutilised links
- Shaped and renewed according to PoP
- Redundancy



Vision

- Deploy UC infrastructures tightly-coupled with the network
- Renater \Rightarrow GEANT \Rightarrow ...
- Ideally : leverage the routers' idle computing power
- Realistically : extend network hubs with servers
 - dedicated to VM hosting
 - proportionally to the PoP size

A Distributed Backbone-based Cloud

Distributed intra-backbone interconnected servers

Single system

- Overlay layer
- Find close adequate nodes
- Retrieve an object ? (VM) ?
- Deal with the scale and uncertainty

On-going work

- Overlay definition
 - Somewhere between a DHT and simple gossip
 - Finding close nodes and routing
- INRIA RR 8348
- INRIA National Lab