

MANTYCHORE

Grant Agreement No.: 261527

Use Cases Overview

Pau Minoves (Technical Manager)

Mantychore @ a Glance

□ Mantychore legacy

- 2006 – Manticore
- 2007 – Manticore II
 - (also with RedIris, Cisco and Juniper)
- 2010 – Mantychore FP7



□ ICT-2010 Call 7

- 1.2.3 – Virtual Research Communities

□ Total Project Cost: 1,564,386€

□ EC contribution: 1,399,740€

□ Start date: October 2010

□ Duration: 30 months

□ Partners composition

- 1 Research Center
- 2 NREN
- 3 users
- 1 commercial operator



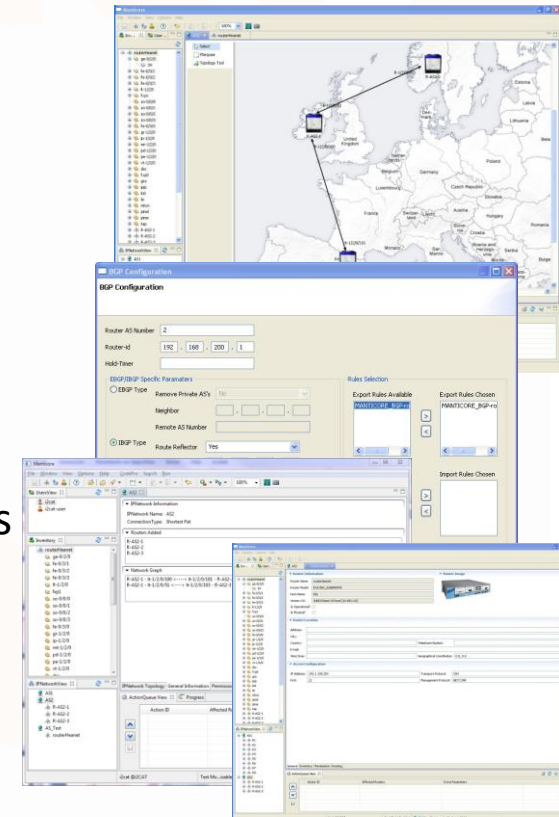
Our Challenge

VISION

- Provide a software implementation and tools for providing and managing routers and IP networks as services.

MISION

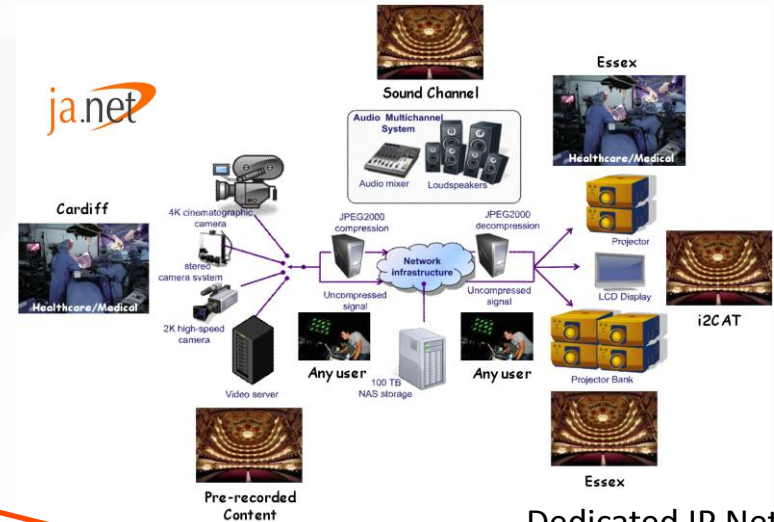
- By means of :
 - Infrastructure Provisioning:
 - Marketplace of Physical/logical routers and IP networks
 - IP Network as a Service:
 - Creation and configuration of IP networks
 - L1 and L2 integration
 - Providing the service to 3 virtual research communities
- Mantychore will be deployed over the infrastructure of 2 NRENS and 3 initial users.



User community e-Health, Media and Grid



Enhanced



Dedicated IP Networks to support **media** services (Wales and Scotland),

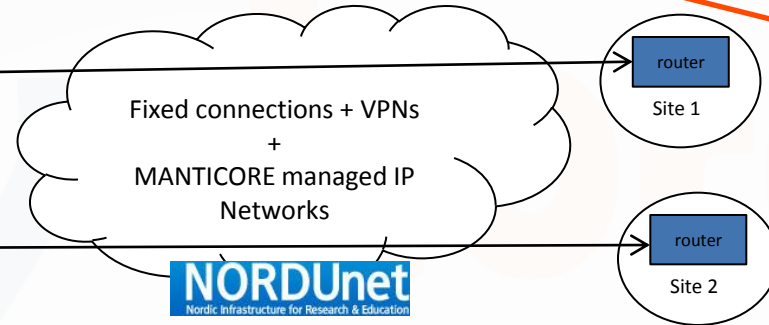
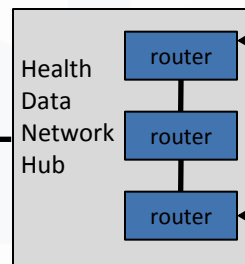


Improving the **Health Data** Network, **UNI•C**



Authorized User

Connection Agreement System



Objective 1: Deploy an operational IP Network as a Service

Enable HEAnet and NORDUnet to provide IP Network Services to their users through the MANTYCHORE tools, **enhancing their service portfolio**; thus providing virtual research communities with a useful service that can **improve their research activities and optimize the efficiency of use of e-Infrastructures**. Mantychore allow third parties to configure network addressing, internal routing, firewalls and external routing policies.

Objective 2: Integrated Layer 1-3 services

Refine and expand the MANTYCHORE services provided by means of **integrating, with IaaS tools**, solutions for optical and Ethernet/MPLS networks (Ether); thus being able to **provide integrated services at levels 1-3 to the research community**.

Objective 3: Marketplace for resource trading

Innovate in the business model used in services based on IaaS, **establishing a marketplace where all Infrastructure Providers can publish their available resources** with their usage conditions (SLA, price), and all customers can automatically negotiate the SLAs getting the best resource combination for their needs.

Objective 4: Carbon-neutral e-Infrastructures

Use MANTYCHORE services to contribute to the research performed in the GreenStar Network (GSN) project to **enable carbon-neutral infrastructures**.

Objective 5: Commercial Exploitation

Evaluate the likelihood of **MANTYCHORE services (open source based) in a commercial telco environment and elaborate a business plan focused on this service for telco operators**.

OPEN PROJECT CONSIDERATIONS

Open Project Approach

❑ Official Website

- Points to all the resources
- www.mantychores.eu



❑ Open Wiki

- <http://jira.i2cat.net:8090/display/MANTECH/Home>

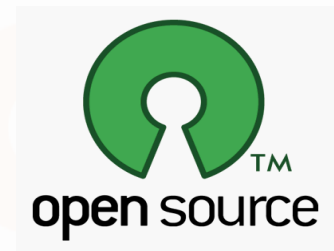
❑ Open Mailing list

- Open technical
- Archives online
- <http://listas.i2cat.net/cgi-bin/mailman/listinfo/mantychores-technical>



❑ Open Source

- <http://anon:anon@svn.i2cat.net/repos/manticore/>



Open Project Approach

- News
- Pointers to all past presentations
- Archives
- How to get a copy of the source code

The screenshot displays the Mantychore Project website. At the top, the logo 'Mantychore' is followed by the text 'Mantychore Project Provide infrastructure resources and IP networks as a service'. Navigation tabs include Home, Mantychore, Partners, Software, Deliverables, and Collaborations. A sidebar menu on the left lists categories like News, Security, and Archives. The main content area features a 'Mantychore' article with text about flexible networks and project goals. A right sidebar contains sections for 'Join the Project', 'Partner Area', and 'Project description' with various links and project details.

Open Project Approach

Mantychore Project
Provide infrastructure resources and IP networks as a service

Log in
Contact us Site map

Home Mantychore Partners Software Deliverables Collaborations

Join the Project

- Get the software
- Open mailing list
- Open wiki
- Send us a quick message

Partner Area

- Register
- Log in

Duration: 36 months
Project Total Cost: 1,564,386€
EC Contribution/Funding: 1,399,740€
Project Coordinator: Sergi Figuerola, I2CAT

Download the brochure!

Mantychore

During the last years, the requirement of flexible, dynamic and driven networks has become a key topic in the emerging community. Usually, configuring the whole network can lead situations, which are increased when there are several networks. Thus, easy, smooth, and transparent configurable networks is an important advantage over other projects aiming at similar objectives. At the same time, the new added network management layer is able to provide new features, which will cover all the possibilities of configuring networks.

The present project takes its heritage from the self-funded MANTICORE II, that is an acronym of **M**aking **A**rticulated Private (APN) **N**etwork Topologies on **I**nternet **C**ORES which is the main theme of the entire project. The new proposal tries to add some new characteristics, hence the name was changed to **Mantychore** to keep the heritage but also distinguish it from earlier projects.

Mantychore will follow the Infrastructure as a Service (IAAS) paradigm to enable National Research and Education Networks (NRENs) and e-Infrastructure providers to enhance their service portfolio by providing infrastructure resources like routers, switches, optical devices, and IP networks as a service to virtual research communities.

Use cases

The Mantychore project will serve a user community that uses and takes benefit of Mantychore services offered by the NRENs. The initial user community in Mantychore is formed by three research user groups, where each user group will use individually the Mantychore services for its own interests. These three user groups include the Danish HDN (Health Data Network), the British UHDM (Ultra High Definition Media) group, and the Irish Grid network. Each user group will perform different activities and use Mantychore services for different goals, for that reason they must determine the activities that they will perform using Mantychore services, and produce an evaluation report at the end of the project about how Mantychore services have been useful for its research activities.

The Danish Health Data Network

□ Pointers to all participation channels

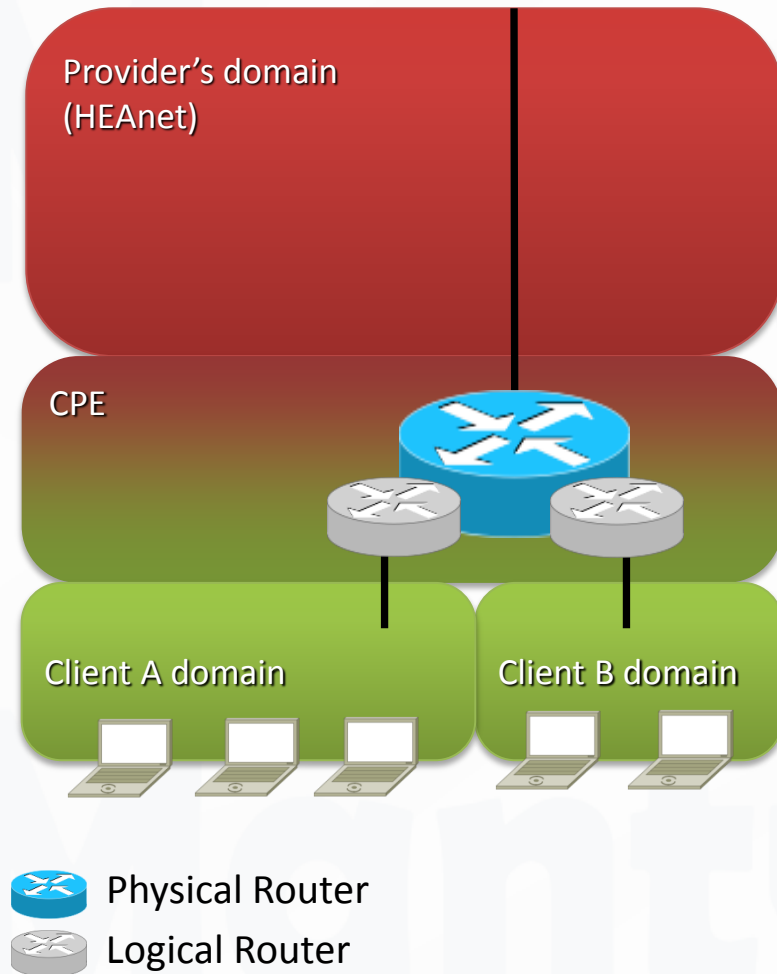
□ Partner only area

Use Cases definition.

SA1

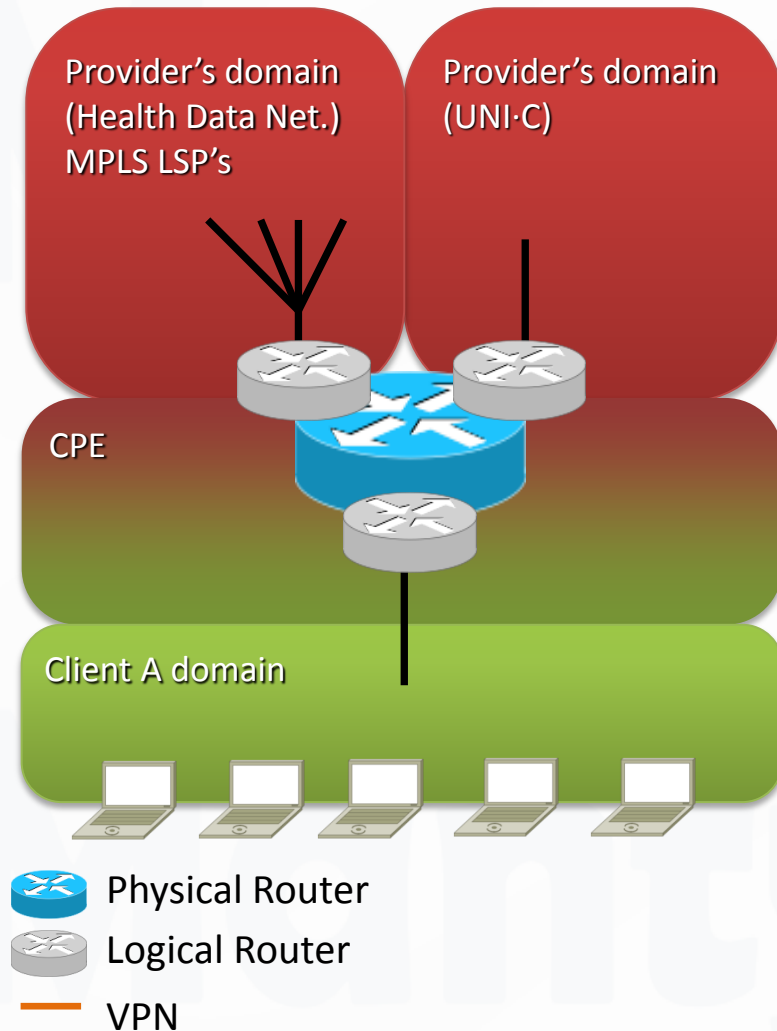
T4.1 REQUIREMENT ANALYSIS

Virtual CPE – Scenario 1



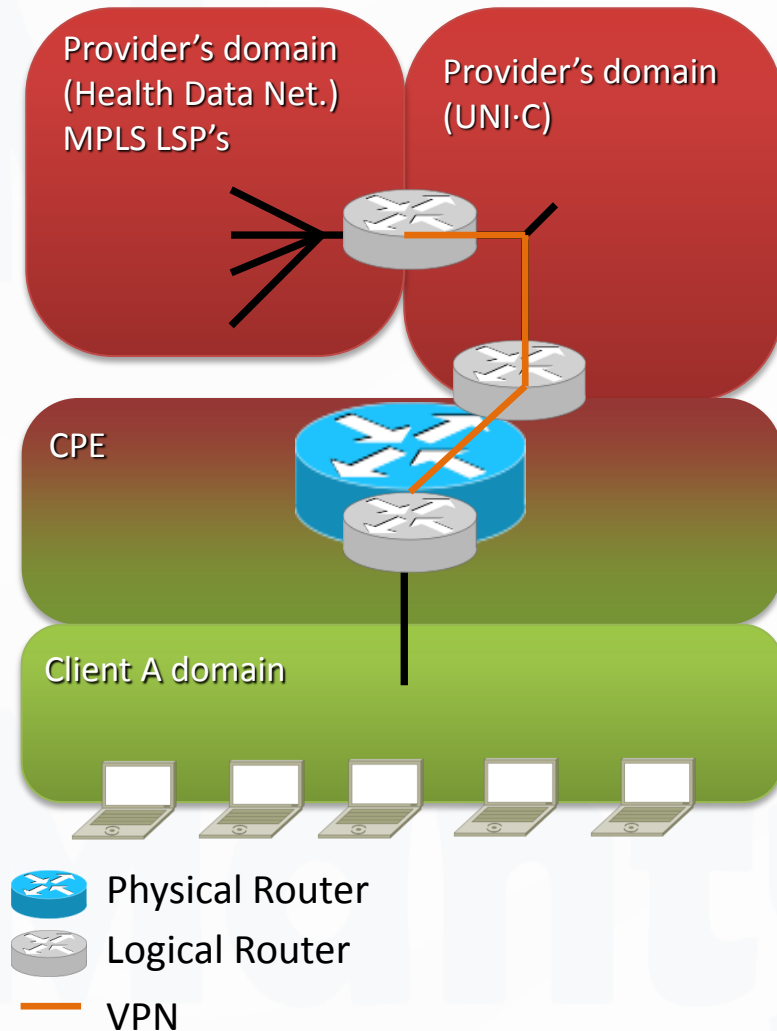
- Providers enforce parts of the CPE configuration
 - i.e. BGP policies.
- Delegation of partial configuration rights to clients.
 - Internal IGP
 - VRRP
 - Firewall
 - ...
- Automatic provisioning of new clients.
- Reduce need for new hardware deployments.

Virtual CPE – Scenario 2



- Providers enforce parts of the CPE configuration
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- Automatic provisioning of access to provider LSP channels.
 - Directly or via a VPN.
- Reduce need for new hardware deployments.
- Reporting to existing accounting infrastructure.

Virtual CPE – Scenario 2

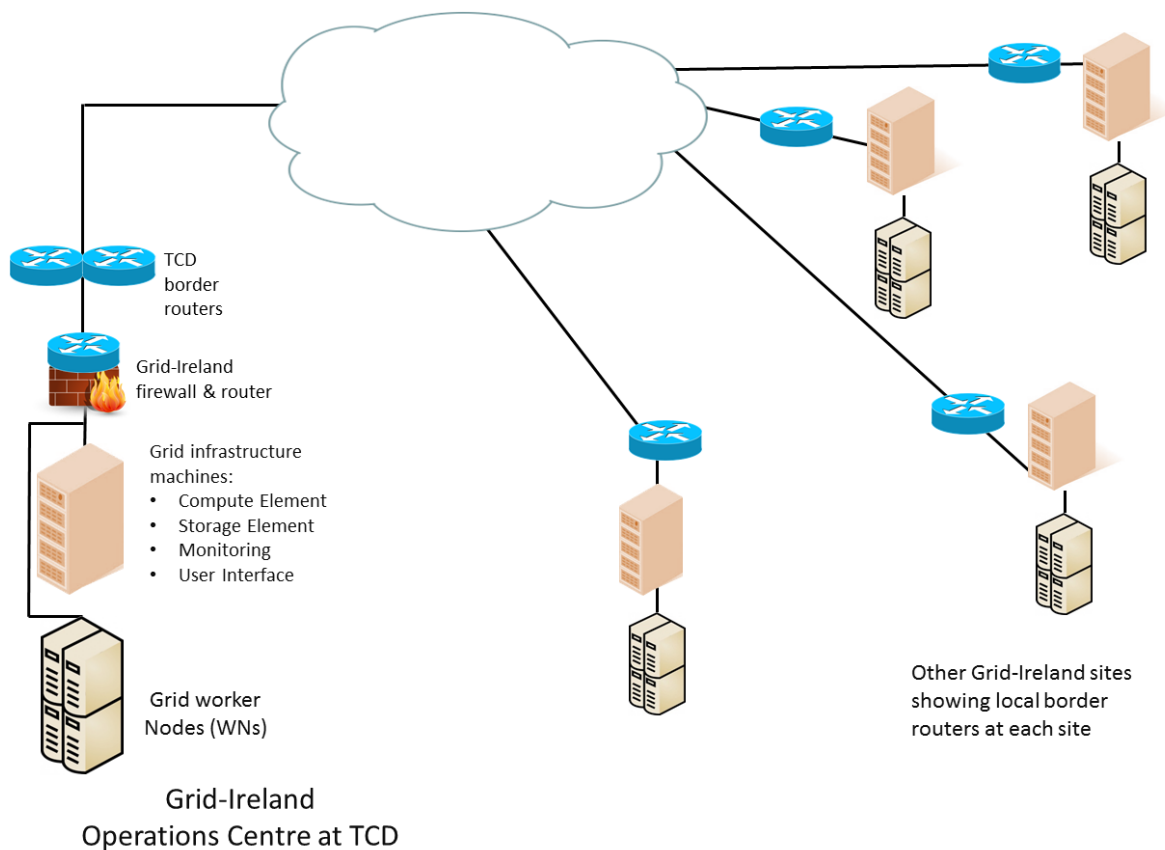


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Distributed and Private Cloud – Scenario 1

- ❑ This scenario will use Grid-Ireland nodes to test complex cloud-like sharing of resources and flexible networks.
- ❑ A grid site is formed by:
 - ❑ Infrastructure nodes
 - ❑ Worker nodes
- ❑ Currently, only infrastructure nodes have connectivity.

Figure 2: Present Architecture of Grid-Ireland Sites

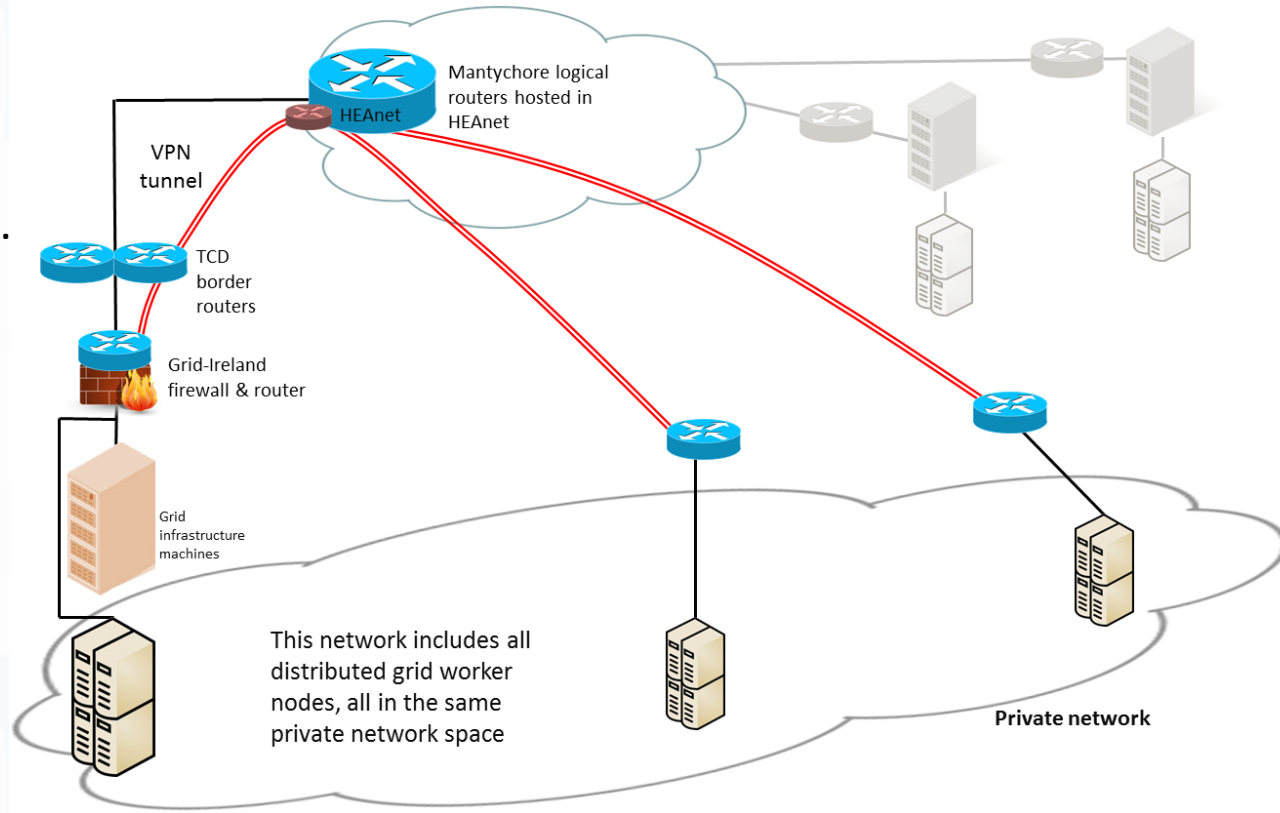


Mantychore WP4 Task 4.1 Authors: Peter Lavin & David O'Callaghan (TCD), Dave Wilson (HEAnet)

Distributed and Private Cloud – Scenario 1

- ❑ We foresee a two stage implementation:
- ❑ At a first stage:
 - ❑ Use of a L3 VPN
 - ❑ Policies at TCD.
 - ❑ Low impact
 - ❑ Will allow the. grid site to meet at a NREN-managed logical router
- ❑ Worked nodes, will be able to be aggregated in a flexible cloud.

Figure 2a: Use Case Architecture for Distributed Grid Site Showing Network Layer

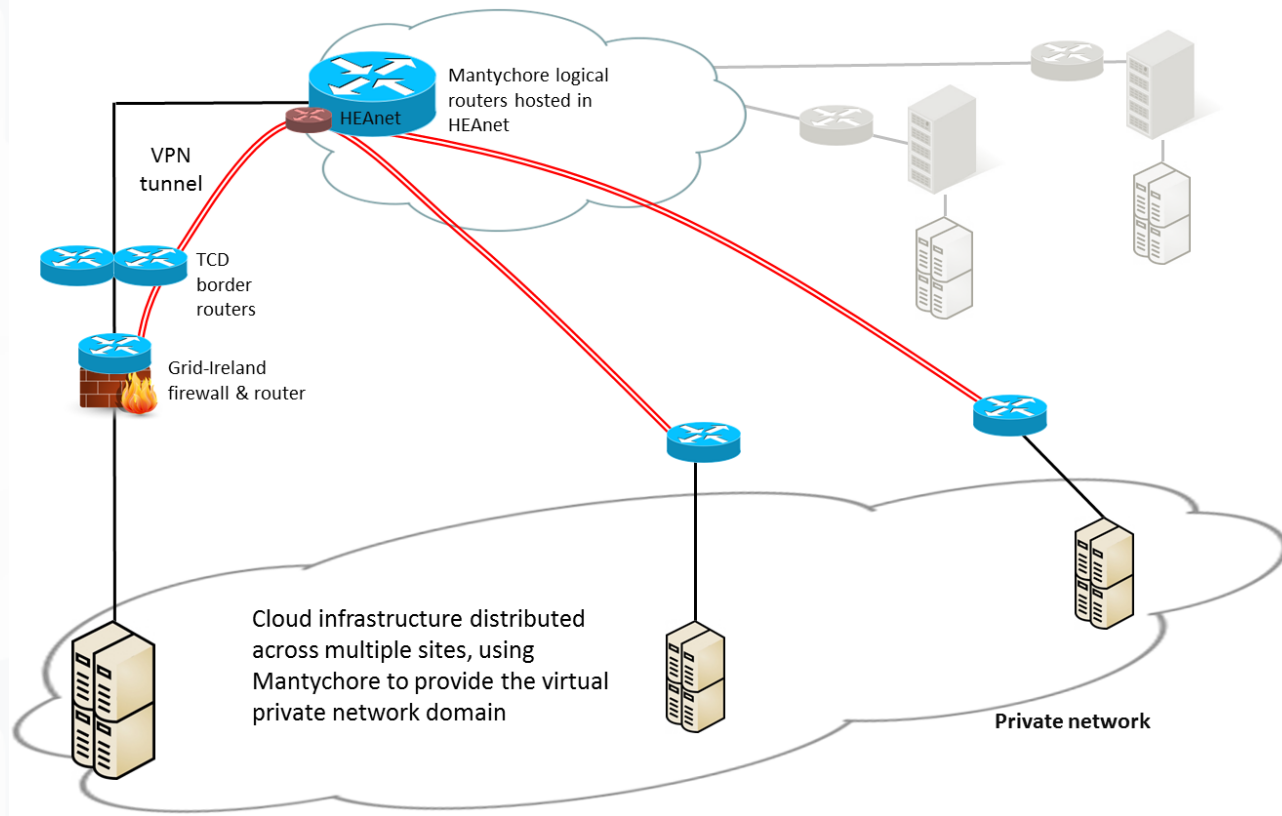


Mantychore WP4 Task 4.1 Authors: Peter Lavin & David O'Callaghan (TCD), Dave Wilson (HEAnet)

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Figure 3: Use Case for Distributed Cloud - Multiple Sites

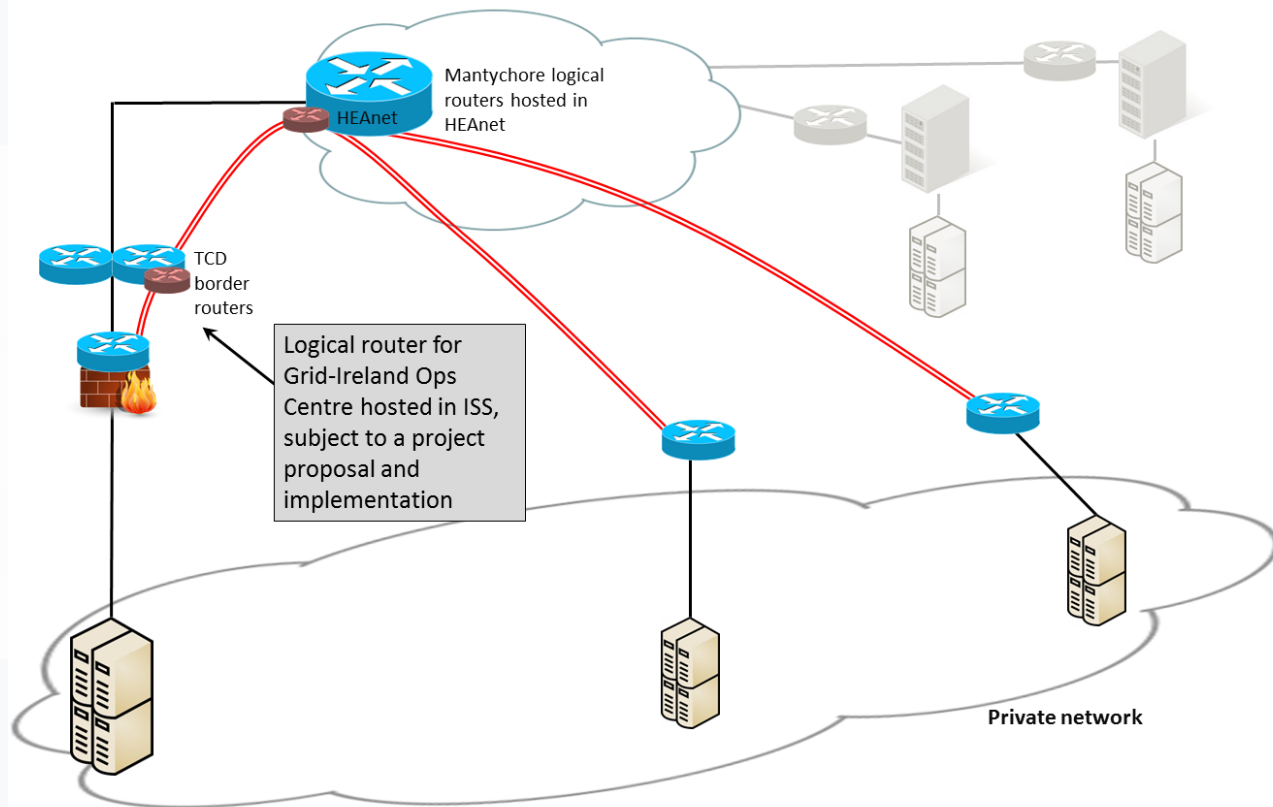


Mantychore WP4 Task 4.1 Authors: Peter Lavin & David O'Callaghan (TCD), Dave Wilson (HEAnet)

Distributed and Private Cloud – Scenario 1

- ❑ We foresee a two stage implementation:
- ❑ At a second stage:
 - ❑ Institutional IT departments will be involved in the setup.
- ❑ Implement L2 solutions where possible.
 - ❑ Avoid tunneling overhead.

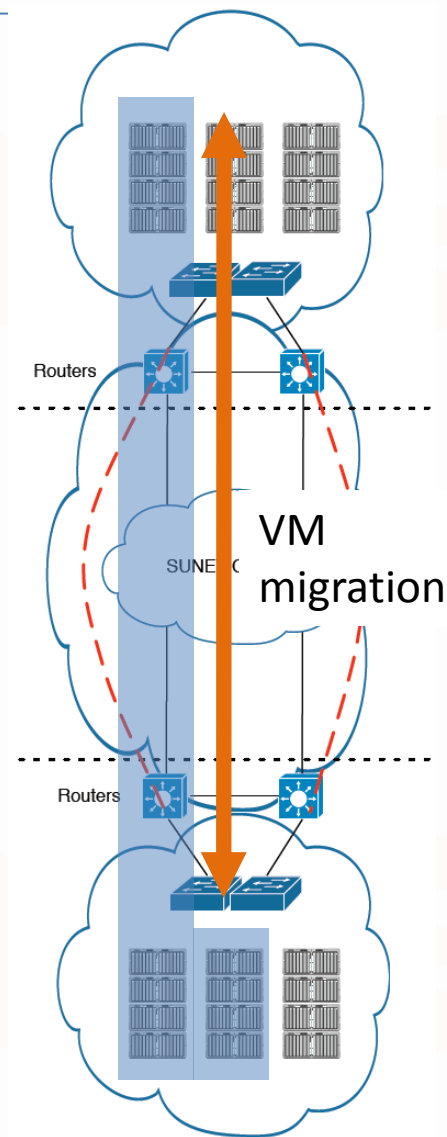
Figure 4: Use Case for Distributed Cluster of Compute Nodes in Cloud Infrastructure Showing Logical Router in ISS Equipment at TCD



Mantychore WP4 Task 4.1 Authors: Peter Lavin & David O'Callaghan (TCD), Dave Wilson (HEAnet)

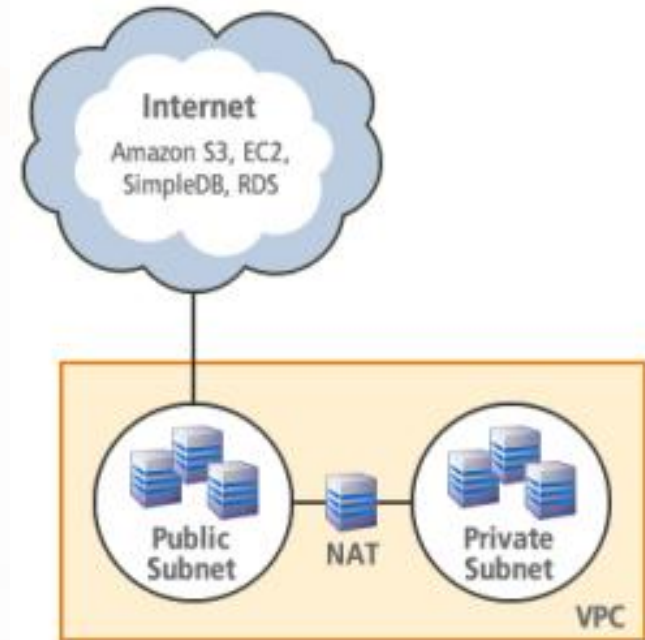
Distributed and Private Cloud – Scenario 2

- ❑ Three actors involved:
 - ❑ Virtual Machine IaaS Provider – NREN or commercial operator.
 - ❑ Offer virtual private clouds.
 - ❑ Configurable user addressing space.
 - ❑ L2 access.
 - ❑ Network IaaS Provider – NREN
 - ❑ SUnet.
 - ❑ Redundant Full mesh LSPs.
 - ❑ Campus
 - ❑ Computing resources consumer.
 - ❑ Router partially managed by Mantychore.
 - ❑ Main requirement:
 - ❑ Network transparency.
 - ❑ Avoid any reconfiguration of >L4 services.



Mantychore vs new Amazon VPC

- ❑ Amazon VPC launched dynamic networks on March'11
- ❑ Amazon VPC has four templates:
 - A) VPC with public subnet.
 - B) VPC with public and private subnet.
 - C) VPC with Internet and VPN access.
 - D) VPC with VPN only access.
- ❑ Mantychore will implement:
 - D -> C -> A.
- ❑ Base technologies
 - Support IPv6 is being studied.
 - VPNs both at L3 and L2 (MPLS, pure-VLAN).
- ❑ Open Source.
 - Inspect the source code.
 - Adapt, customize.
 - Deploy on your own infrastructure.
 - Integrate with existing deployed systems.



Ultra High Definition Applications

Deployment of next generation multimedia applications

3D, UHD

Stream producers and consumers.

3D medical applications.

3D virtual tourism.

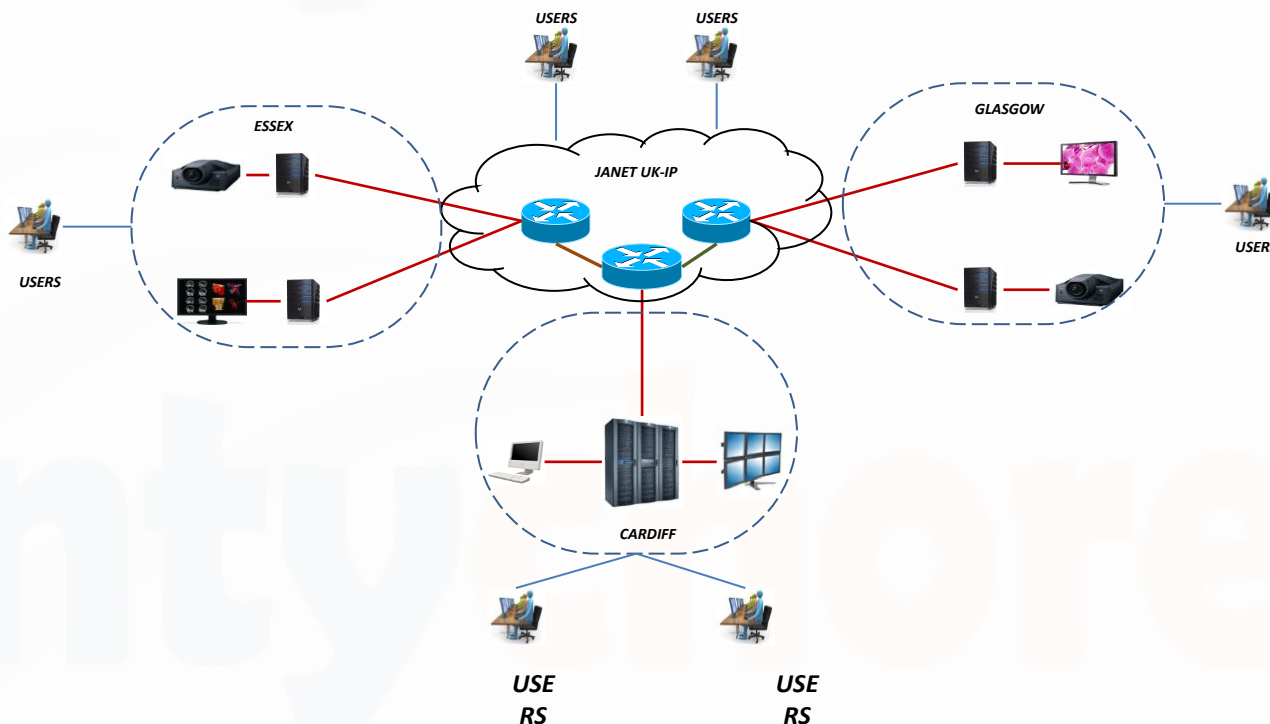
Flexibility to adjust, network independent of underlying infrastructure.

Bandwidth on Demand.

Physical topology



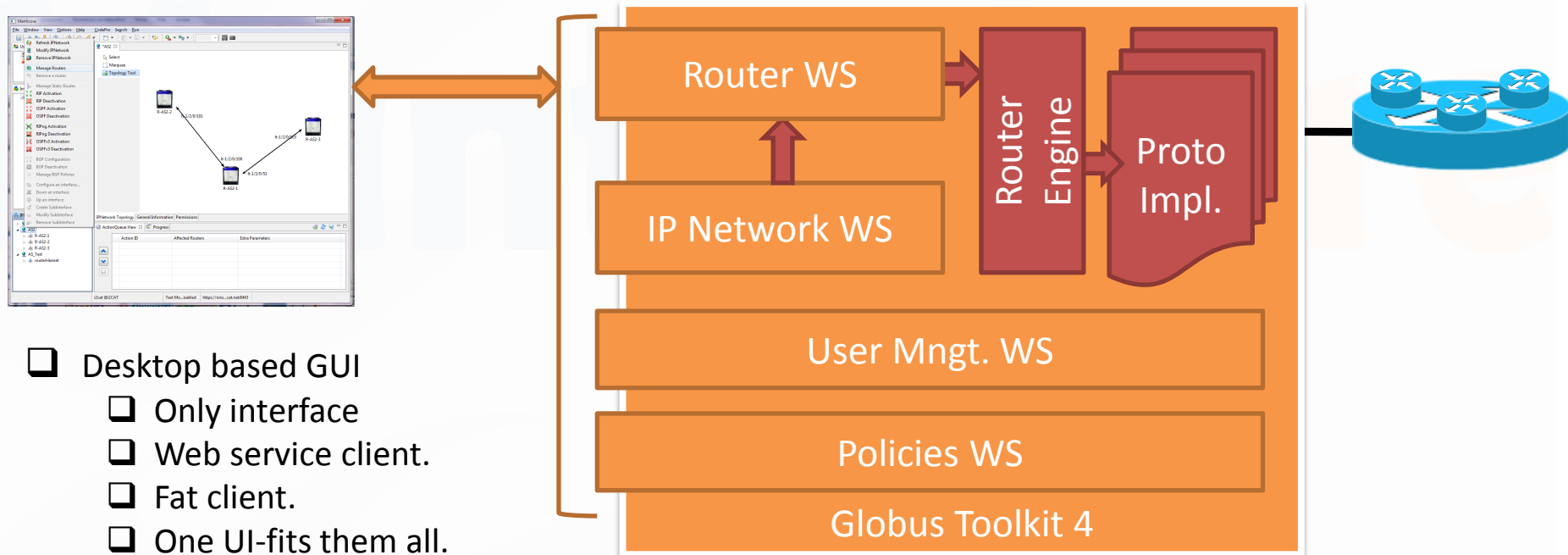
Logical topology



SA1

T4.2 SOFTWARE DEVELOPMENT

Manticore 2 architecture



- ❑ Desktop based GUI
 - ❑ Only interface
 - ❑ Web service client.
 - ❑ Fat client.
 - ❑ One UI-fits them all.
- ❑ Main functionality exposed via two WS:
 - ❑ Router
 - ❑ IP Network
- ❑ Integrated User management and policy definition.
- ❑ Development based on GT4.



Resource Manager Center

The screenshot displays the Mantychore Resource Manager Center interface, which is used for configuring and managing network resources. The main window shows a network topology diagram with three routers: R-AS2-2, R-AS2-1, and R-AS2-3. R-AS2-2 is connected to R-AS2-1 via interface It-1/2/0/101. R-AS2-1 is connected to R-AS2-3 via interface It-1/2/0/51. R-AS2-1 also has a subinterface It-1/2/0/100.

Overlaid on the main window are several configuration windows:

- OSPF Activation - Areas Configuration:** A window for configuring OSPF areas. It includes fields for Area ID, Area Type, and a table for defining areas. The table has columns for Area ID, Routers, Interfaces, and SubInt.
- Modify Physical Topology:** A window for setting which west router interface is connected to which east router interface. It includes fields for Router Name, Router Model, Interface Type, Interfaces, and SubInterfaces for both Router WEST and Router EAST.
- ActionQueue View:** A window showing the progress of actions. It contains a table with columns for Action ID, Affected Routers, and Extra Parameters. The table shows an action named CONFIGURE_RIP_ROUTE.
- Manticore:** A menu-driven interface for managing network resources. It includes options for Refresh IPNetwork, Modify IPNetwork, Remove IPNetwork, Manage Routers, Remove a router, Manage Static Routes, RIP Activation, RIP Deactivation, OSPF Activation, OSPF Deactivation, IPng Activation, IPng Deactivation, OSPFv3 Activation, OSPFv3 Deactivation, BGP Configuration, BGP Deactivation, Manage BGP Policies, Configure an interface..., Down an interface, Up an interface, Create SubInterface, Modify SubInterface, and Remove SubInterface.

The bottom status bar of the main window shows the user 'i2cat @i2CAT', the test mode 'Test Mo...isabled', and the URL 'https://orio...cat.net:8443'.

Planned Mantychore architecture

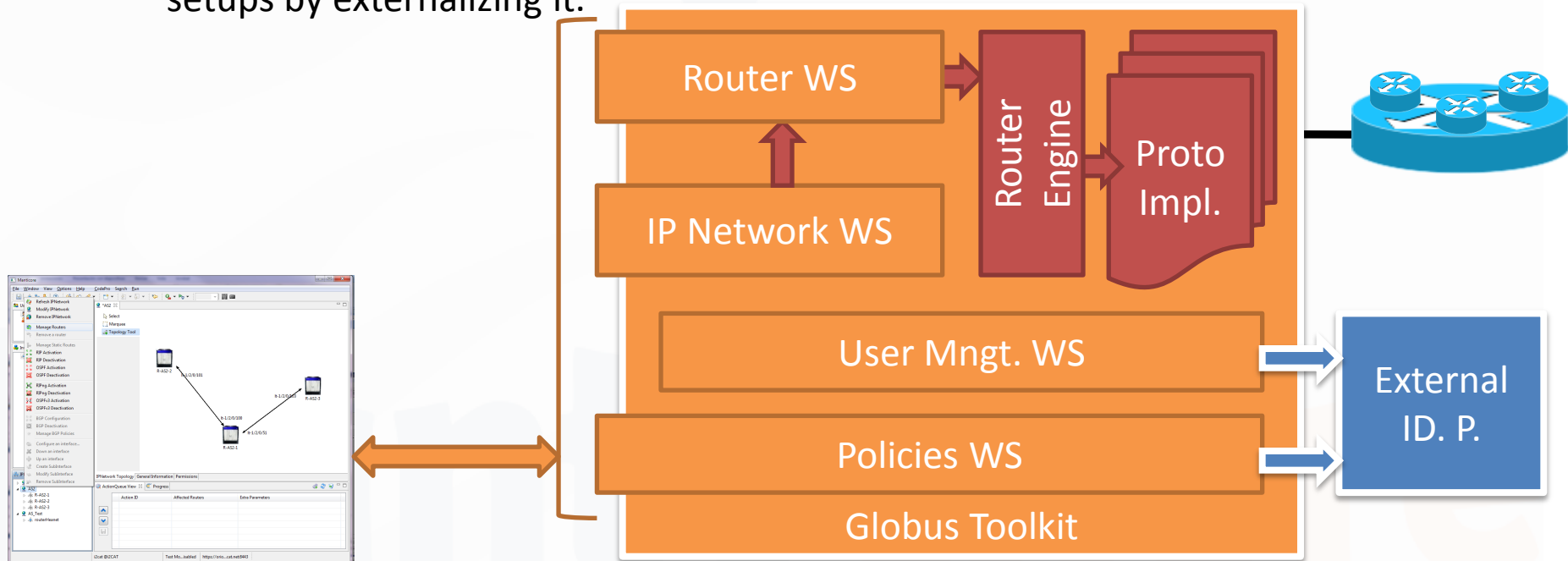
❑ User Management

- ❑ Extract User Management functionalities to Mantychore's GUI.

- ❑ Integrate with NREN's existing Identify Provider functionality.

 - ❑ EduGAIN, etc

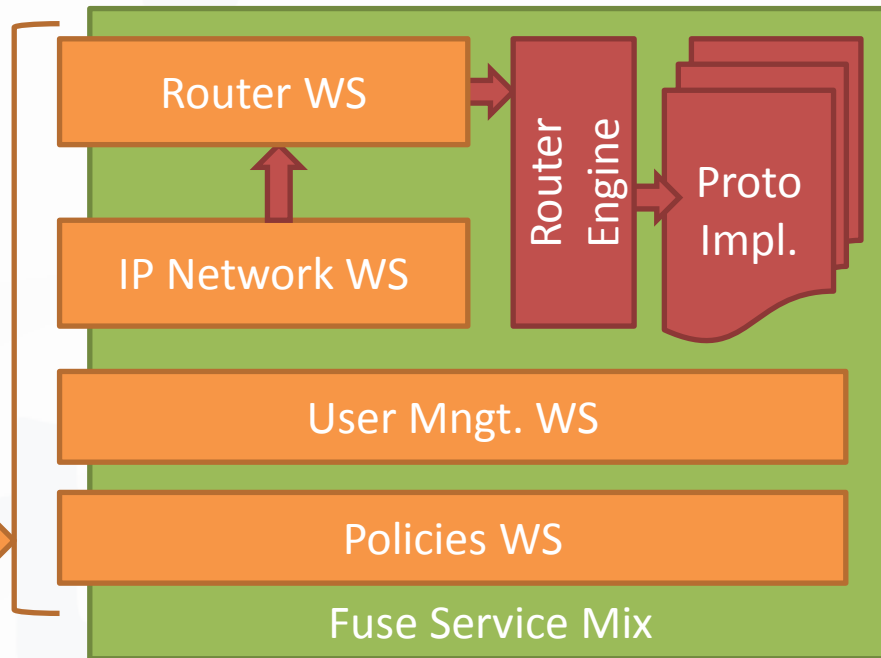
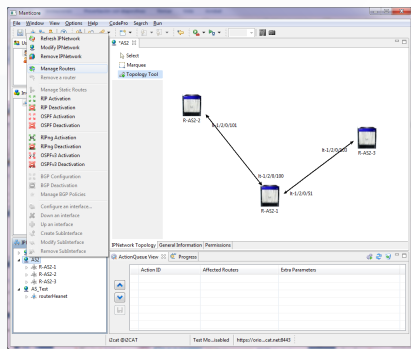
- ❑ This is not a core Mantychore functionality and we can reach more complex setups by externalizing it.



Planned Mantychore architecture

❑ Base technologies

- ❑ Upgraded to state of the art (see next slide).
- ❑ Globus Toolkit dropped in favor of Fuse ServiceMix (OSGi).
- ❑ Upgraded development environment:
 - ❑ Build system (Maven).
 - ❑ Test environment.
 - ❑ Runtime.
- ❑ Friendlier to developers.



Technologies

Development

maven



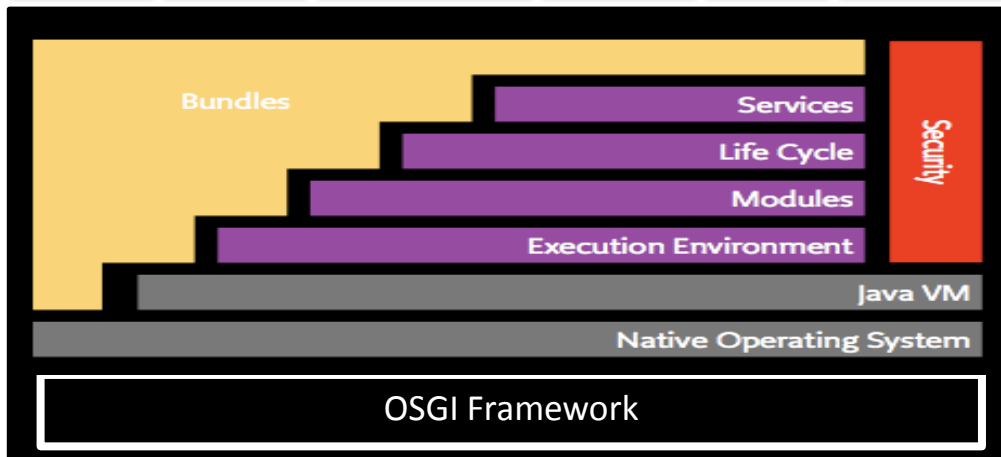
Testing

JUnit org



Fuse™ ESB Kernel

Console Logging Provisioning Deployer Admin Spring DM

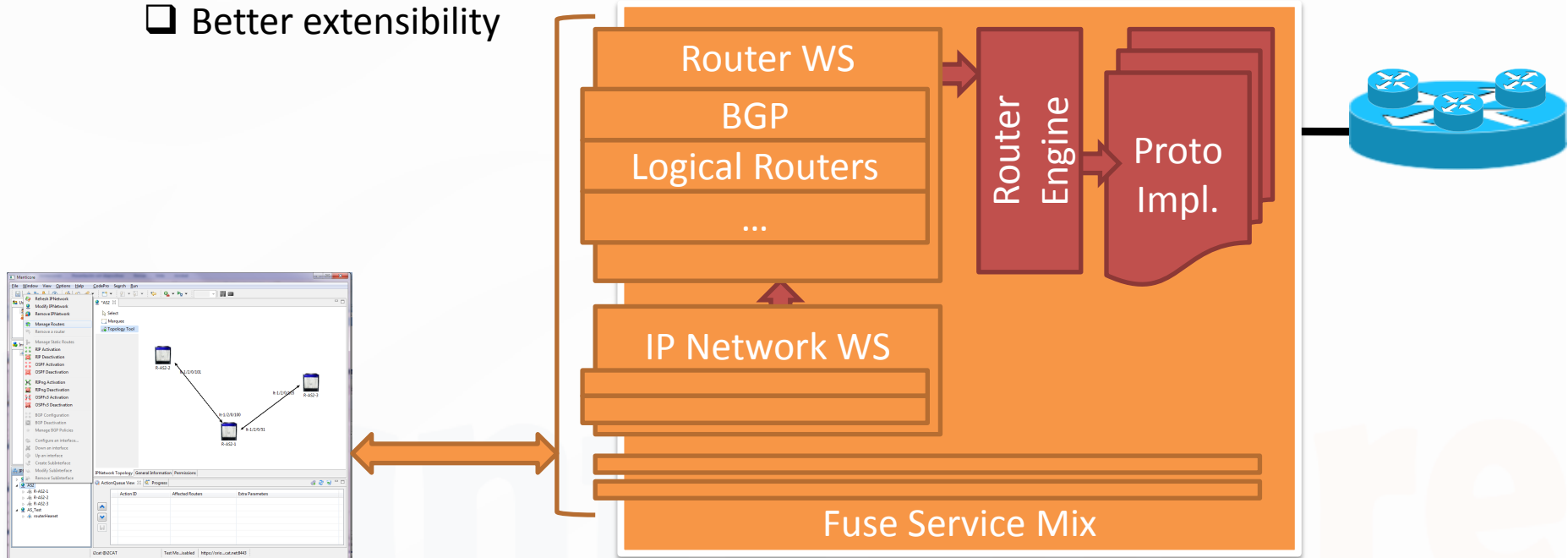


Security



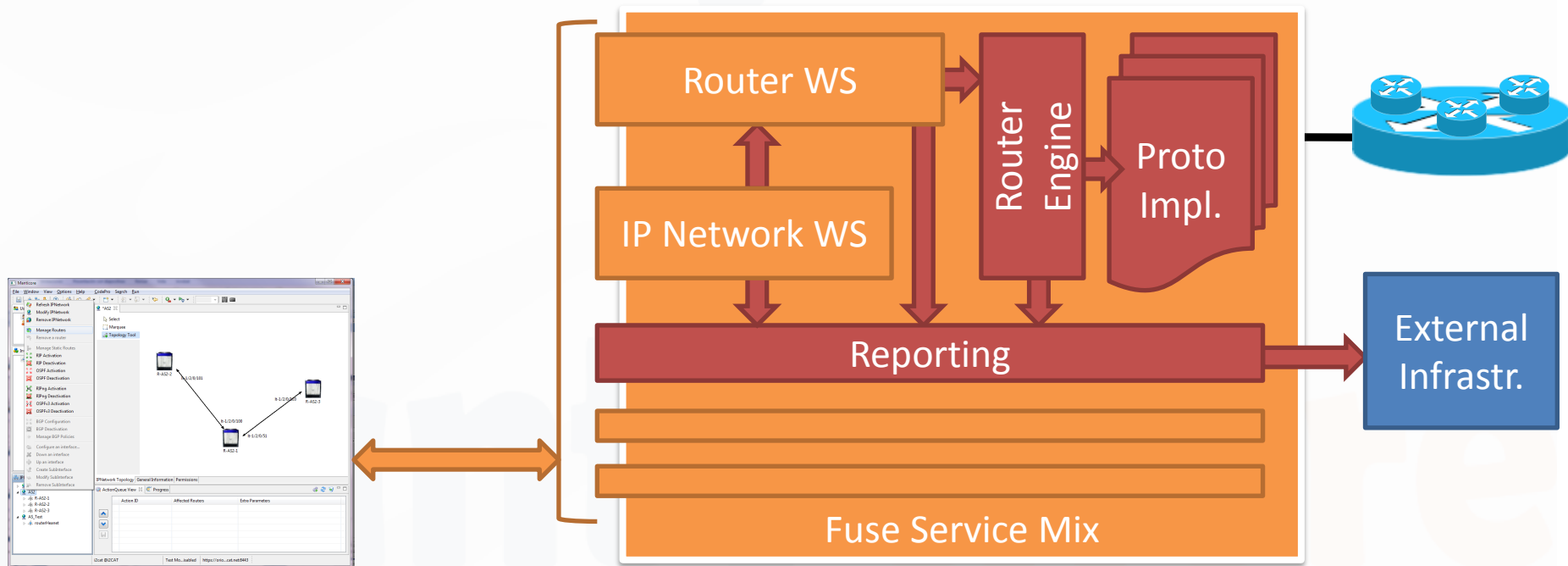
Planned Mantychore architecture

- ❑ External API
 - ❑ Functionality exported in smaller blocks.
 - ❑ Called “Capabilities”.
 - ❑ Allows for functionality discovery.
 - ❑ Allow for easier client development.
 - ❑ Better extensibility



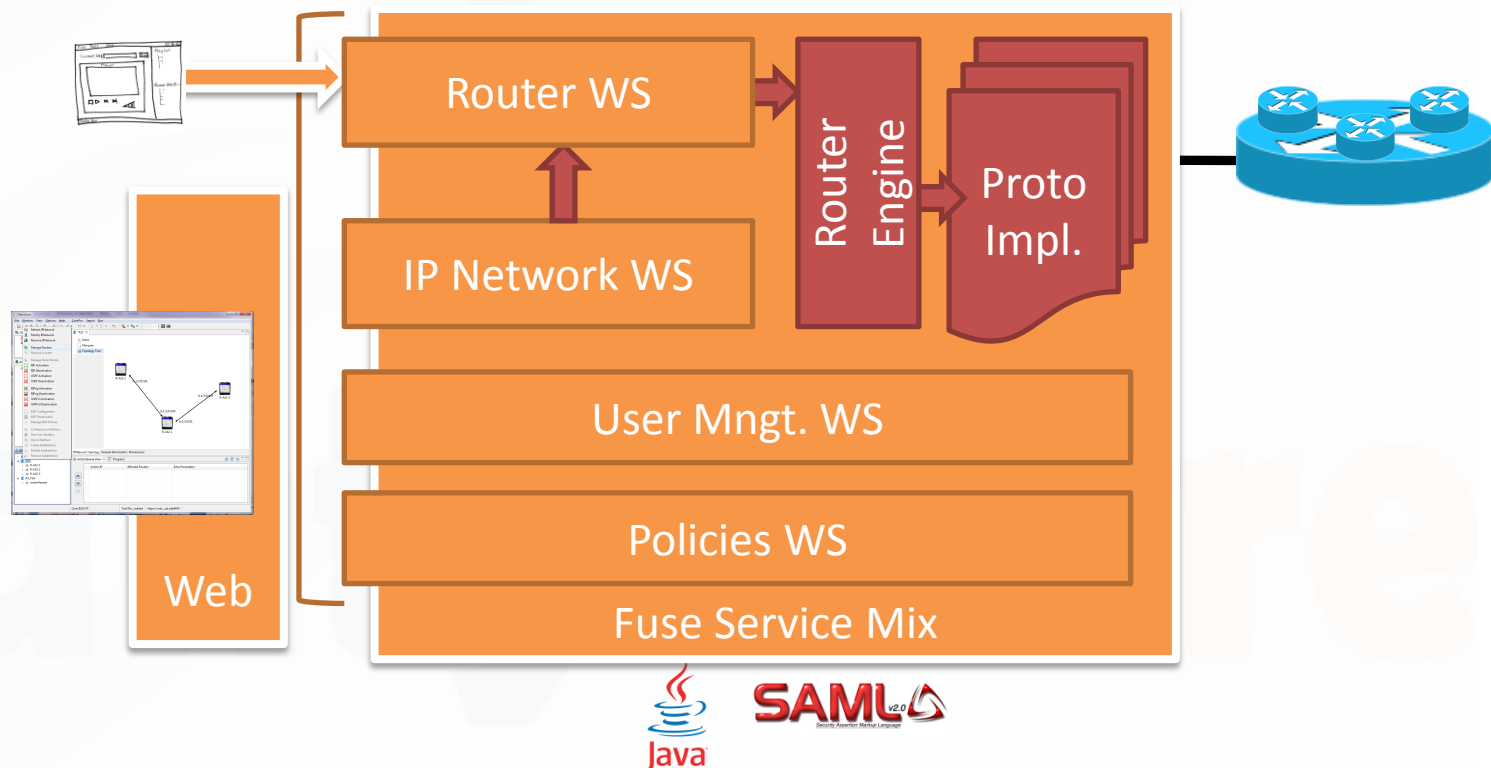
Planned Mantychore architecture

- ❑ Reporting System.
 - ❑ Better reporting of execution outcome.
 - ❑ Some use cases don't need the user to receive the error but an external role (IT department, NOC operator, etc).



Planned Mantychore architecture

- ❑ Web based interface.
 - ❑ Main GUI will be ported to web technologies.
 - ❑ Much more streamlined update process, easier to deploy upgrades.
- ❑ Additionally simpler single Use Case interfaces will be developed.



Don't hesitate to contact us at mantychore-technical@listas.i2cat.net for further information.

THANKS!