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

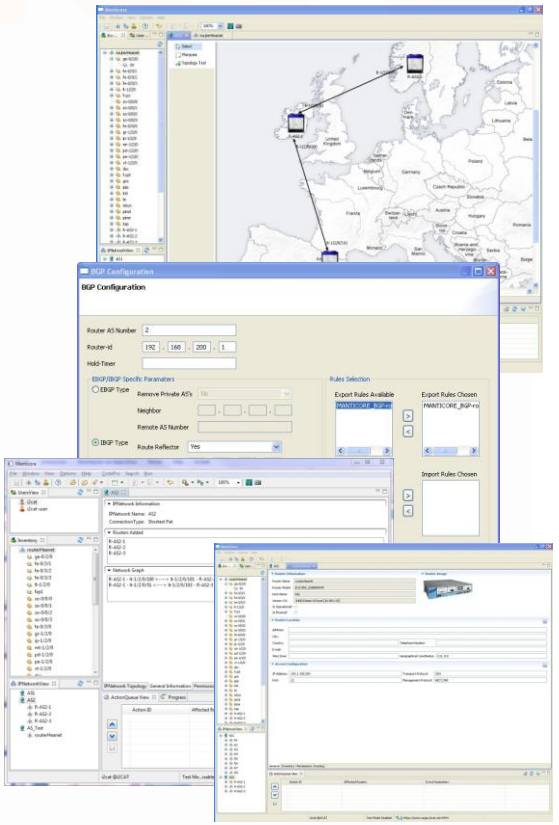
Our Challenge

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

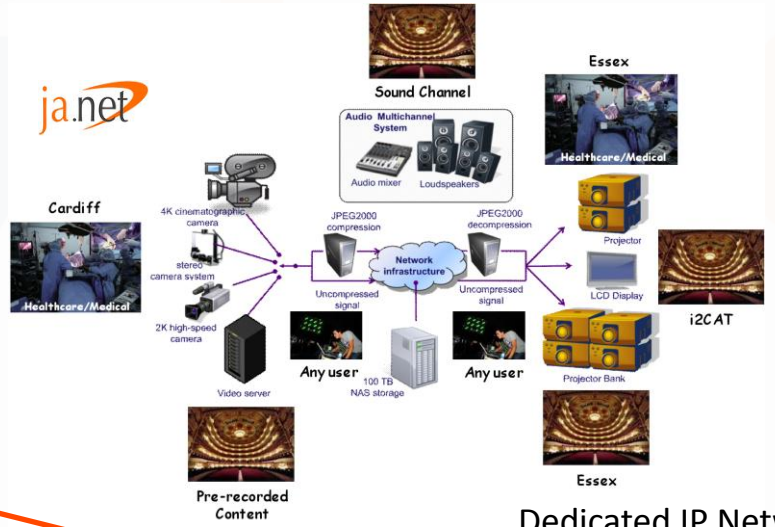


- Mantychore will be deployed over the infrastructure of 2 NRENS and 3 initial users.

User community
e-Health, Media and Grid

Enhanced

G… …d "Cloud Layer", TCD



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

University of Essex

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

Grid-Ireland

Authorized User

Connection Agreement System

Health Data Network Hub

router
router
router

Fixed connections + VPNs
+
MANTICORE managed IP Networks

NORDUnet
Nordic Infrastructure for Research & Education

router
Site 1

router
Site 2

Mantychore

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 likehood 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

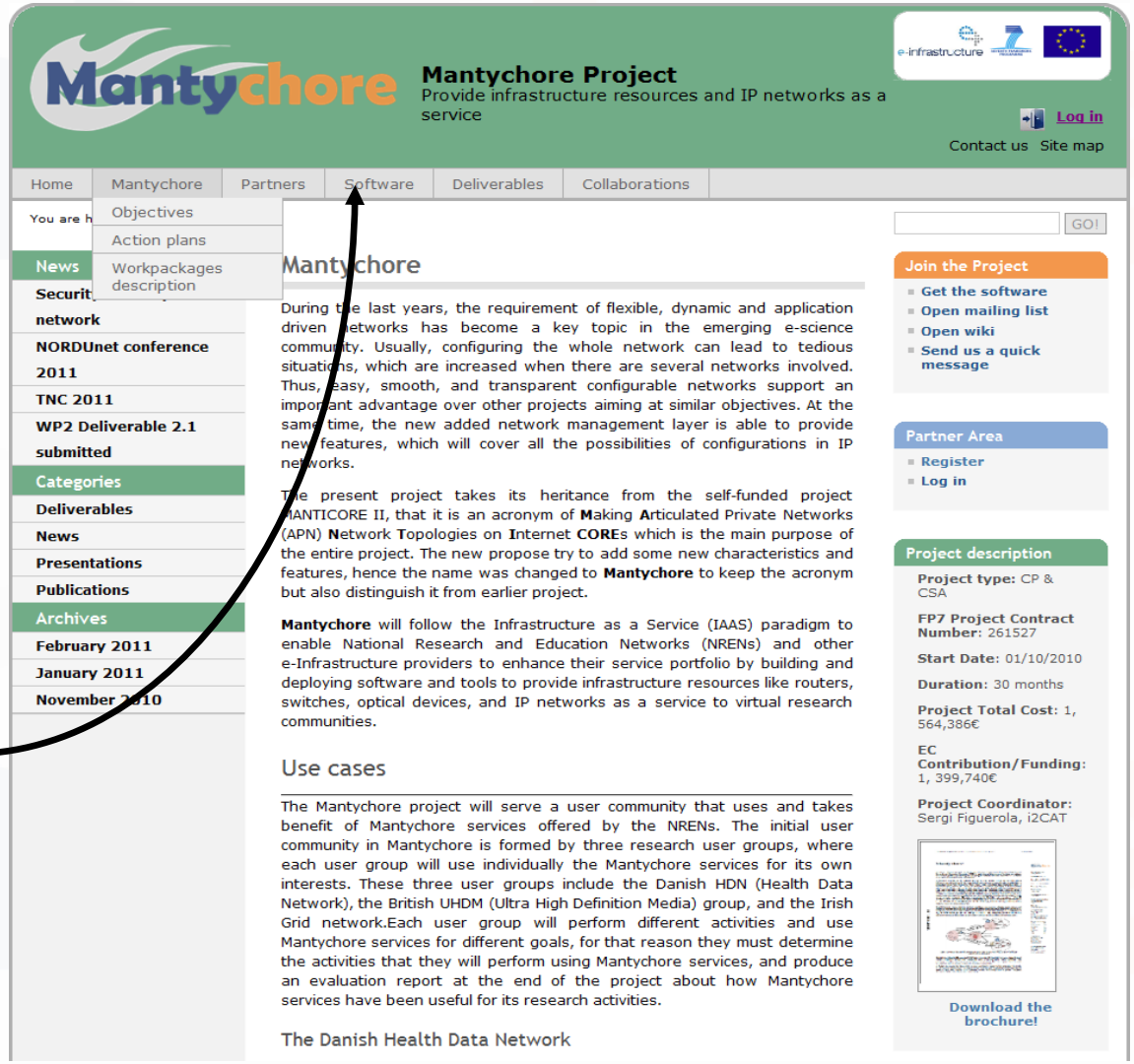
Open Project Approach

- Official Website
  - Points to all the resources
  - www.mantychore.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/mantychore-technical
- Open Source
  - http://anon:anon@svn.i2cat.net/repos/manticore/

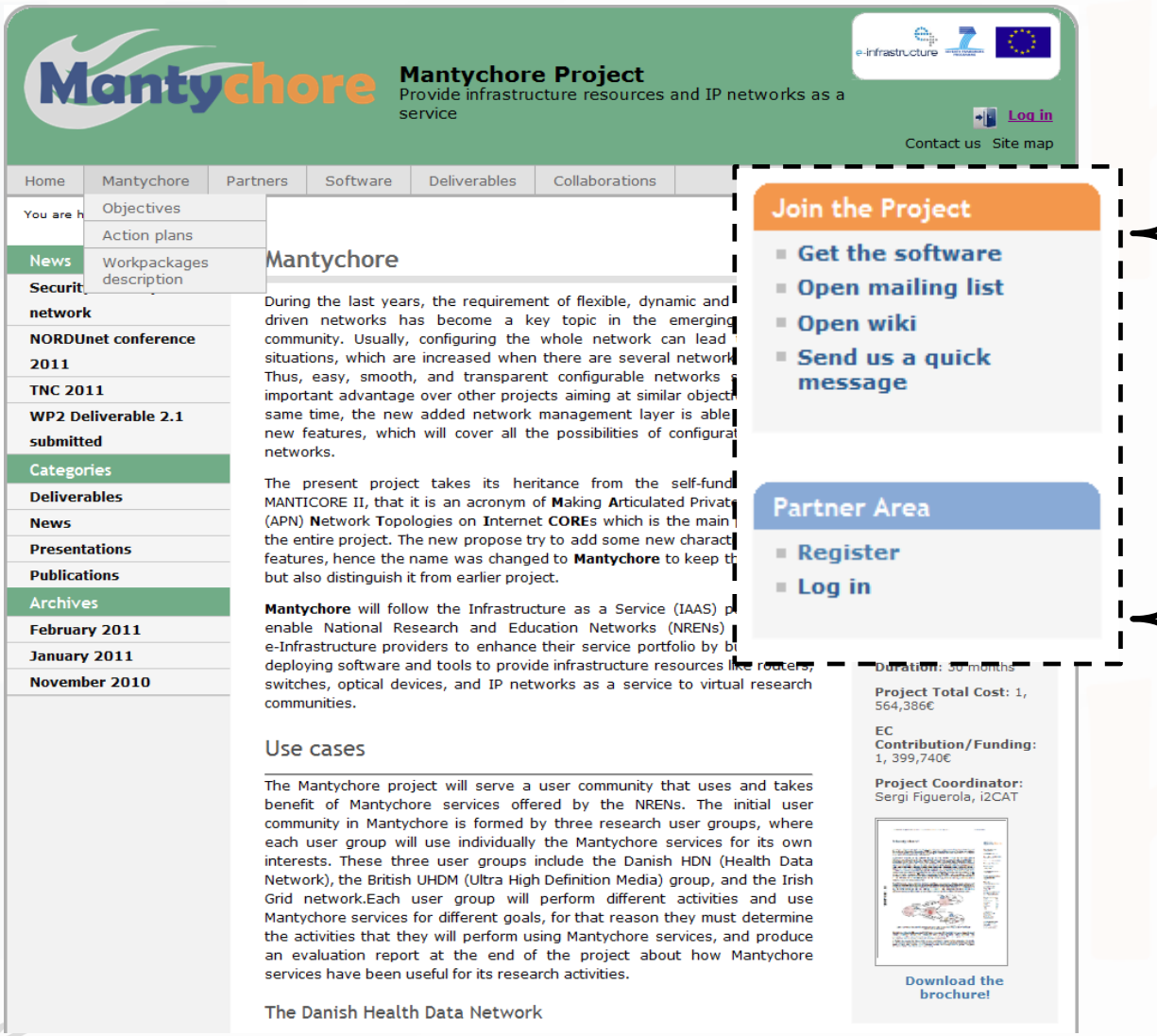
Open Project Approach

- News
- Pointers to all past presentations
- Archives

- How to get a copy of the source code



Open Project Approach



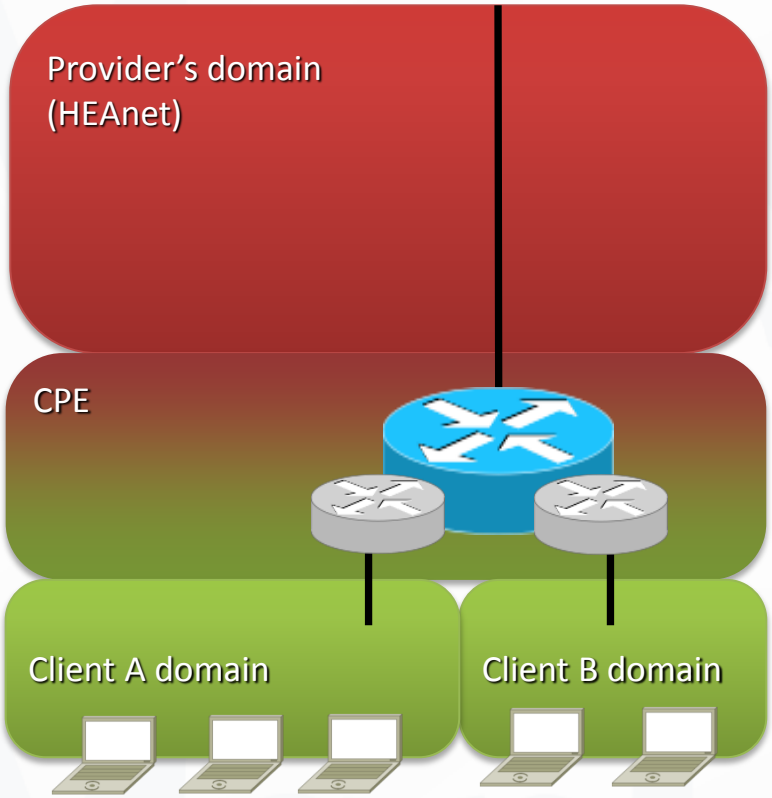
- Pointers to all participation channels
- Partner only area

Use Cases definition.

SA1

T4.1 REQUIREMENT ANALYSIS

Virtual CPE – Scenario 1

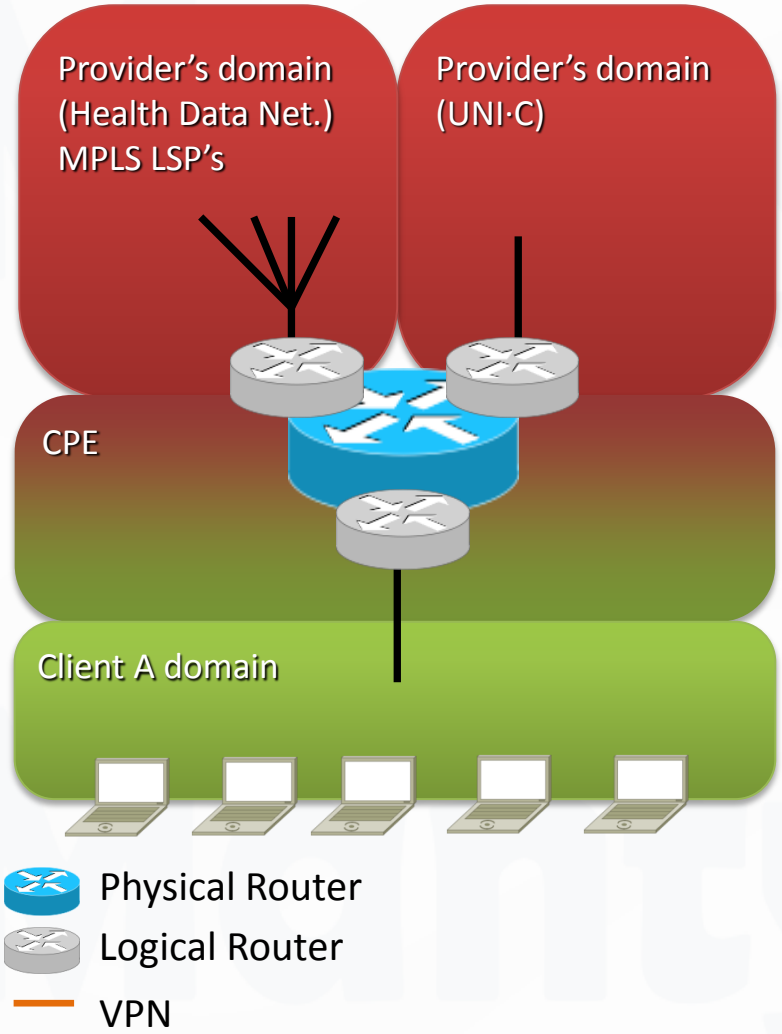


Physical Router

Logical Router

- 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



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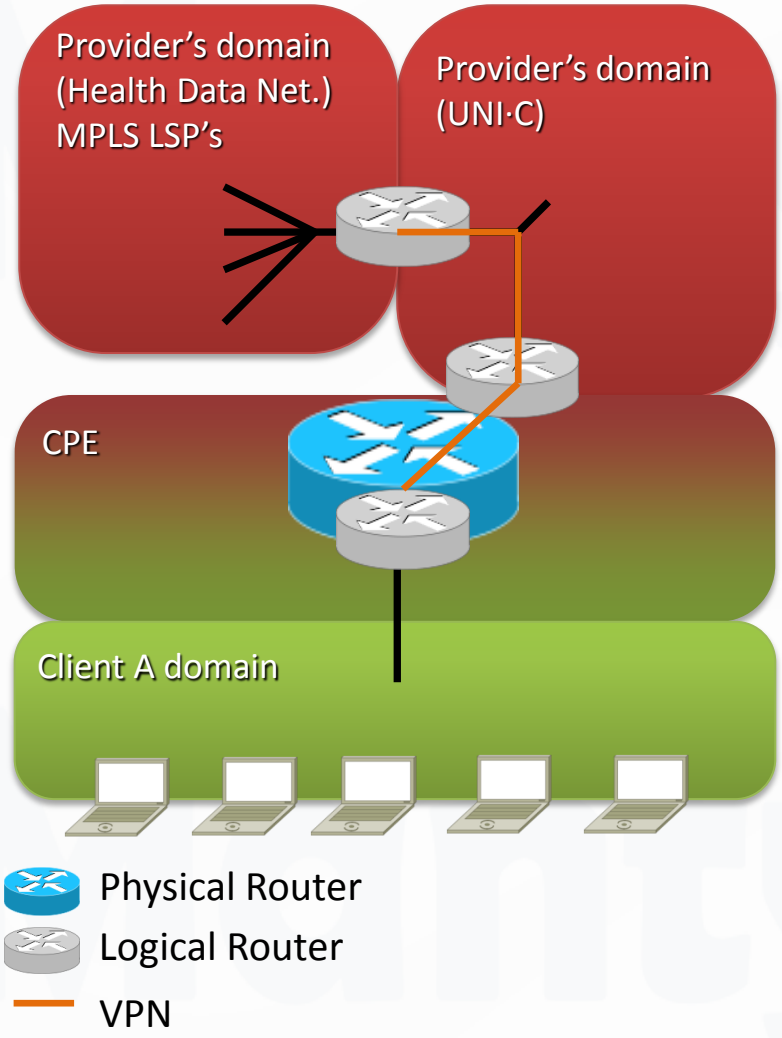
  - Firewall
  - …
- Automatic provisioning of access to provider LSP channels.
  - Directly or via a VPN.
- Reduce need for new hardware deployments.
- Reporting to existing accounting infrastructure.

Virtual CPE – Scenario 2



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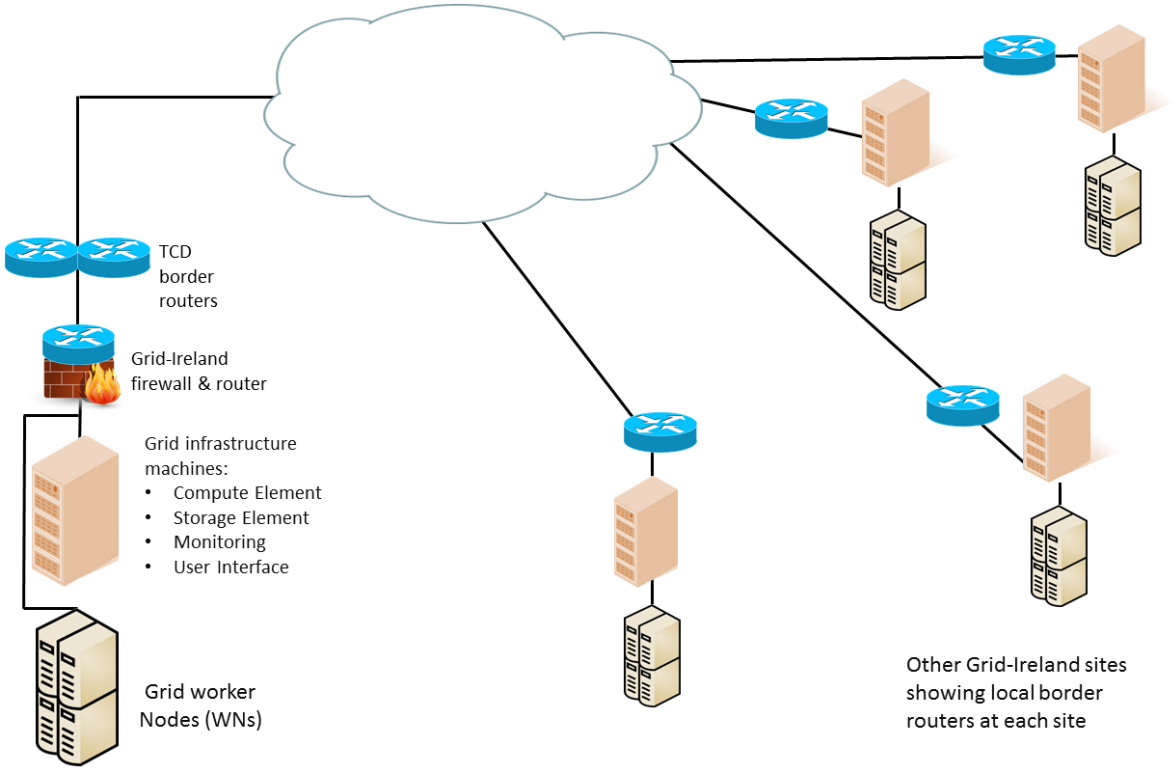
Distributed and Private Cloud – Scenario 1

- 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

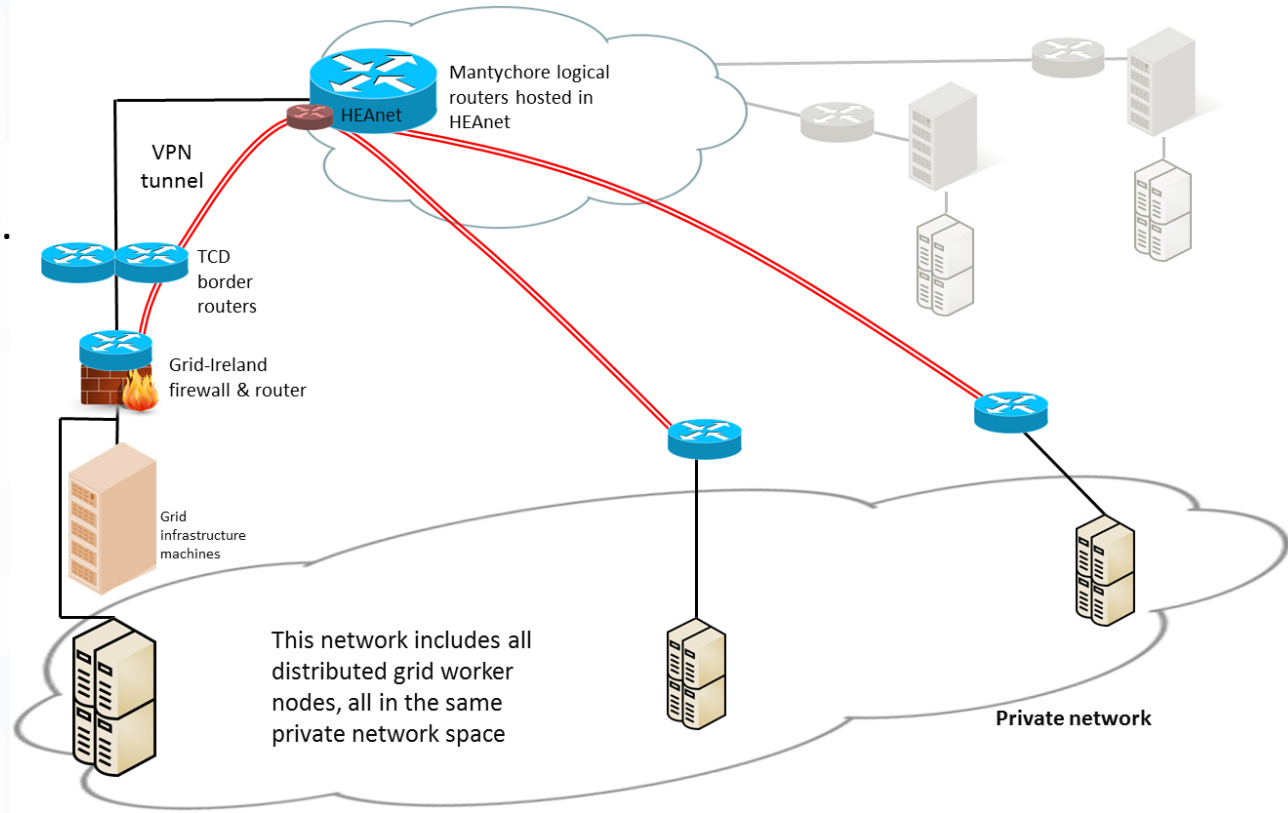


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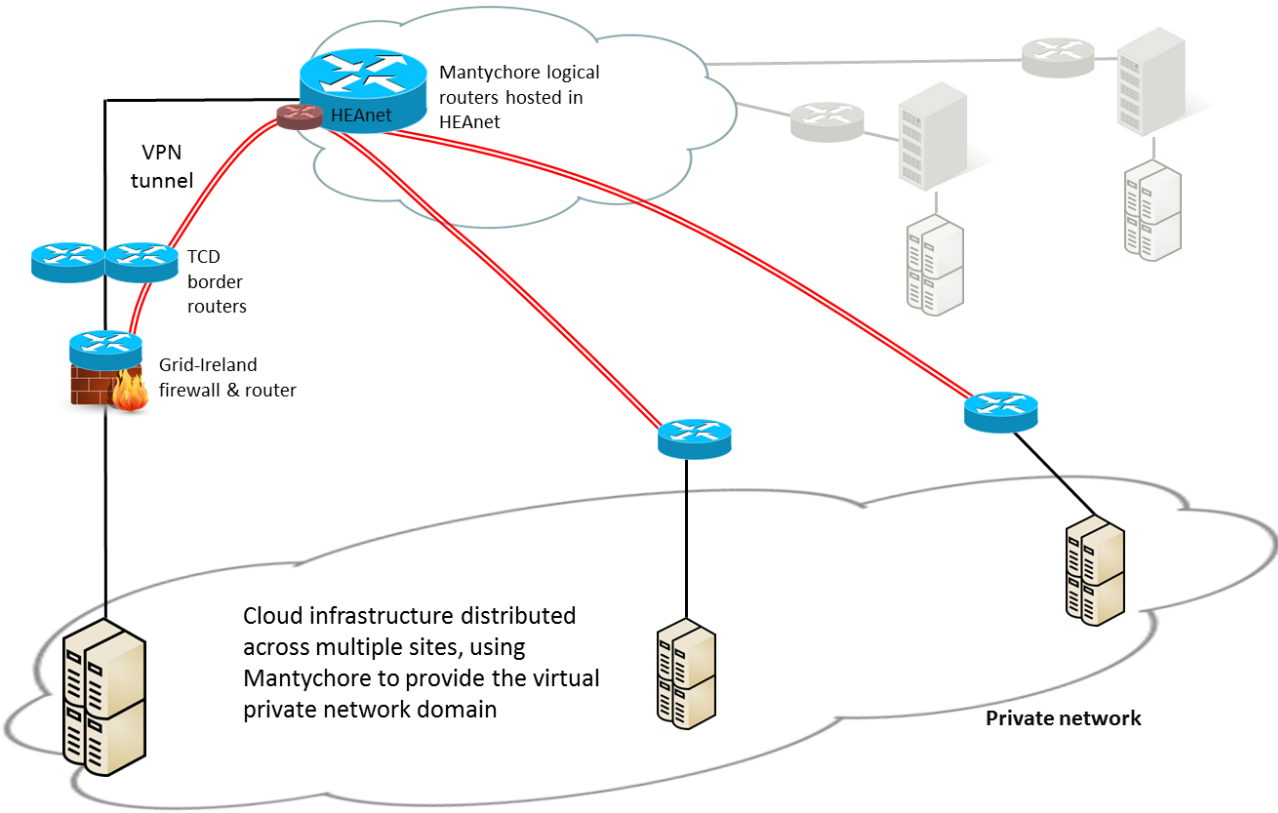
Figure 3: Use Case for Distributed Cloud - Multiple Sites

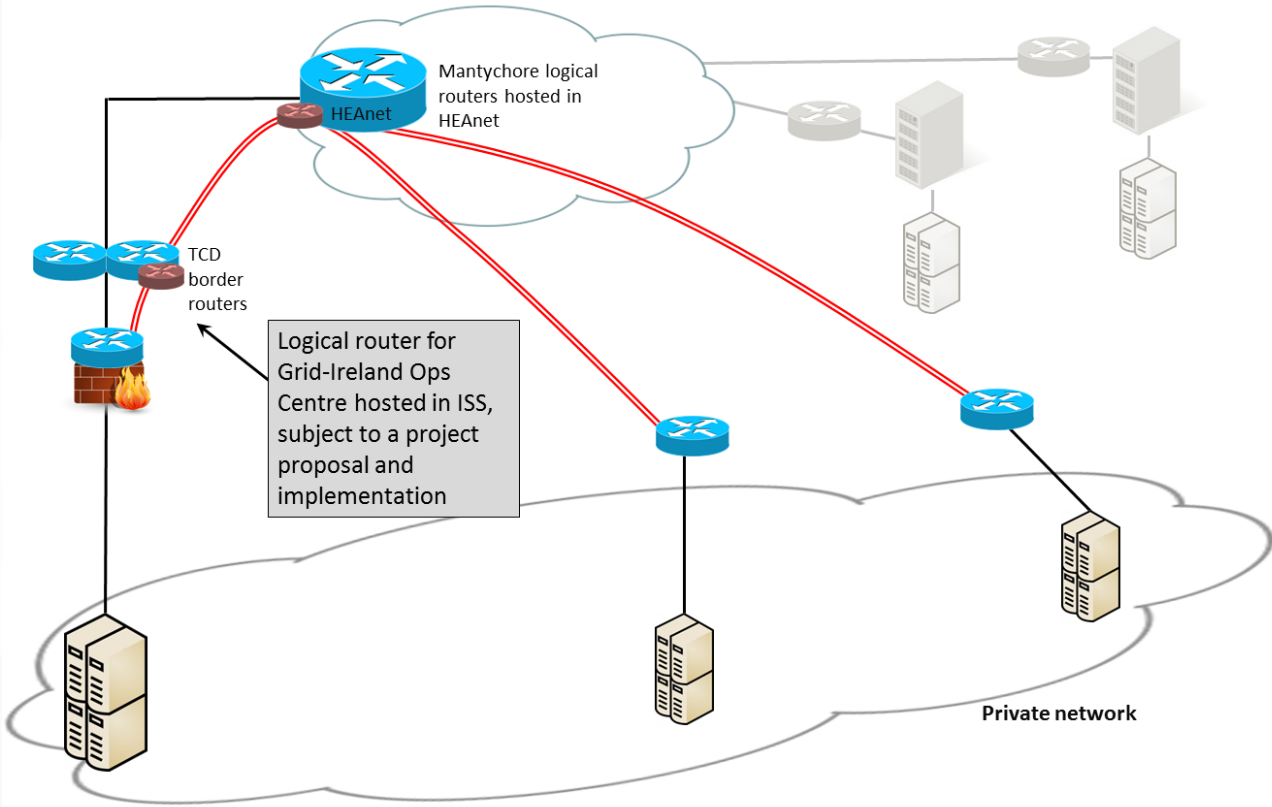


Mantychore WP4 Task 4.1 Authors: Peter Lavin & David O'Callaghan (TCD), Dave Wilson (HEAnet)

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.

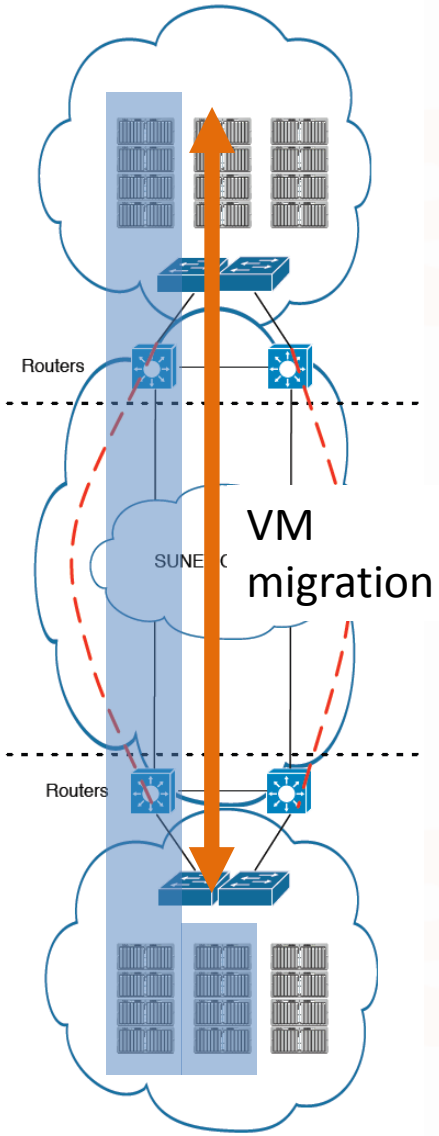
Figure 4: Use Case for Distributed Cluster of Compute Nodes in Cloud Infrastructure Showing Logical Router in ISS Equipment at TCD



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

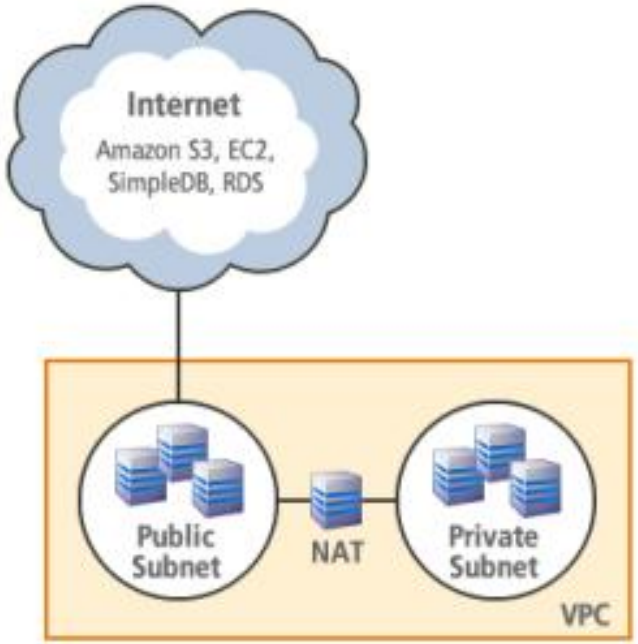
Distributed and Private Cloud – Scenario 2

- Three actors involved:
  - Virtual Machine IaaS Provider – NREN or comercial 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.

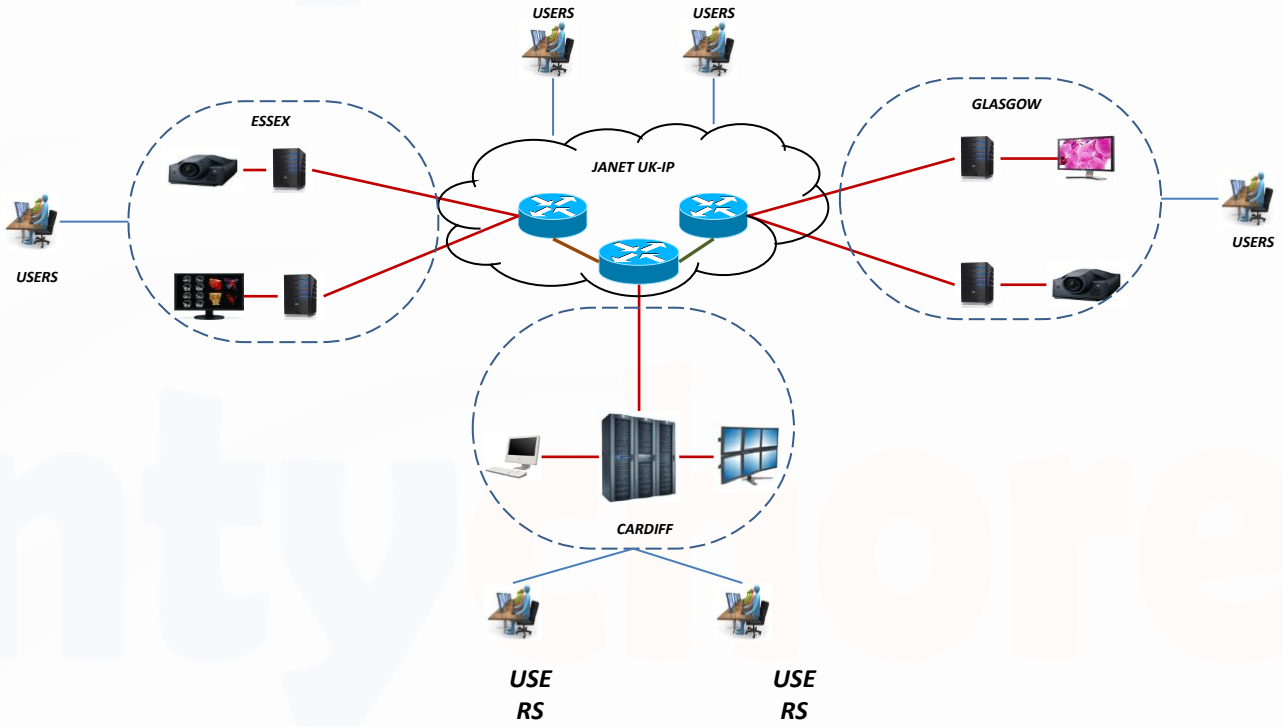


Ultra High Definition Applications

- 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

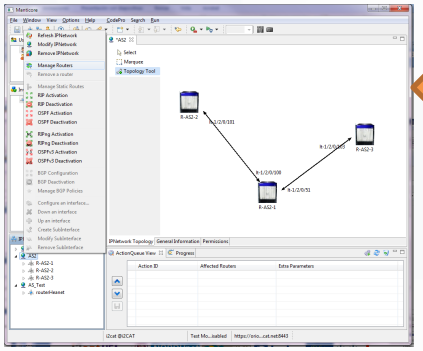
Logical topology

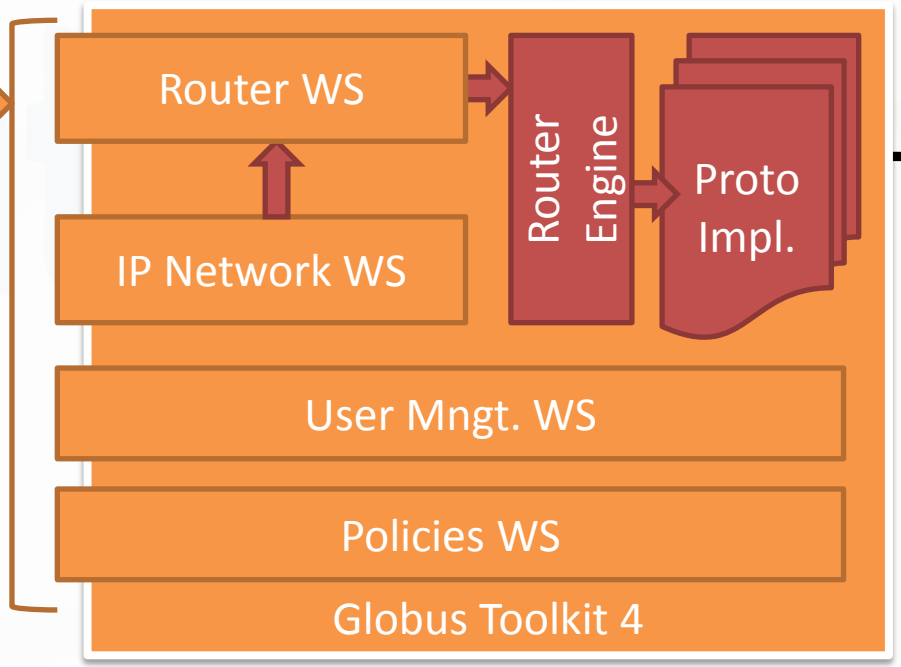


SA1

T4.2 SOFTWARE DEVELOPMENT

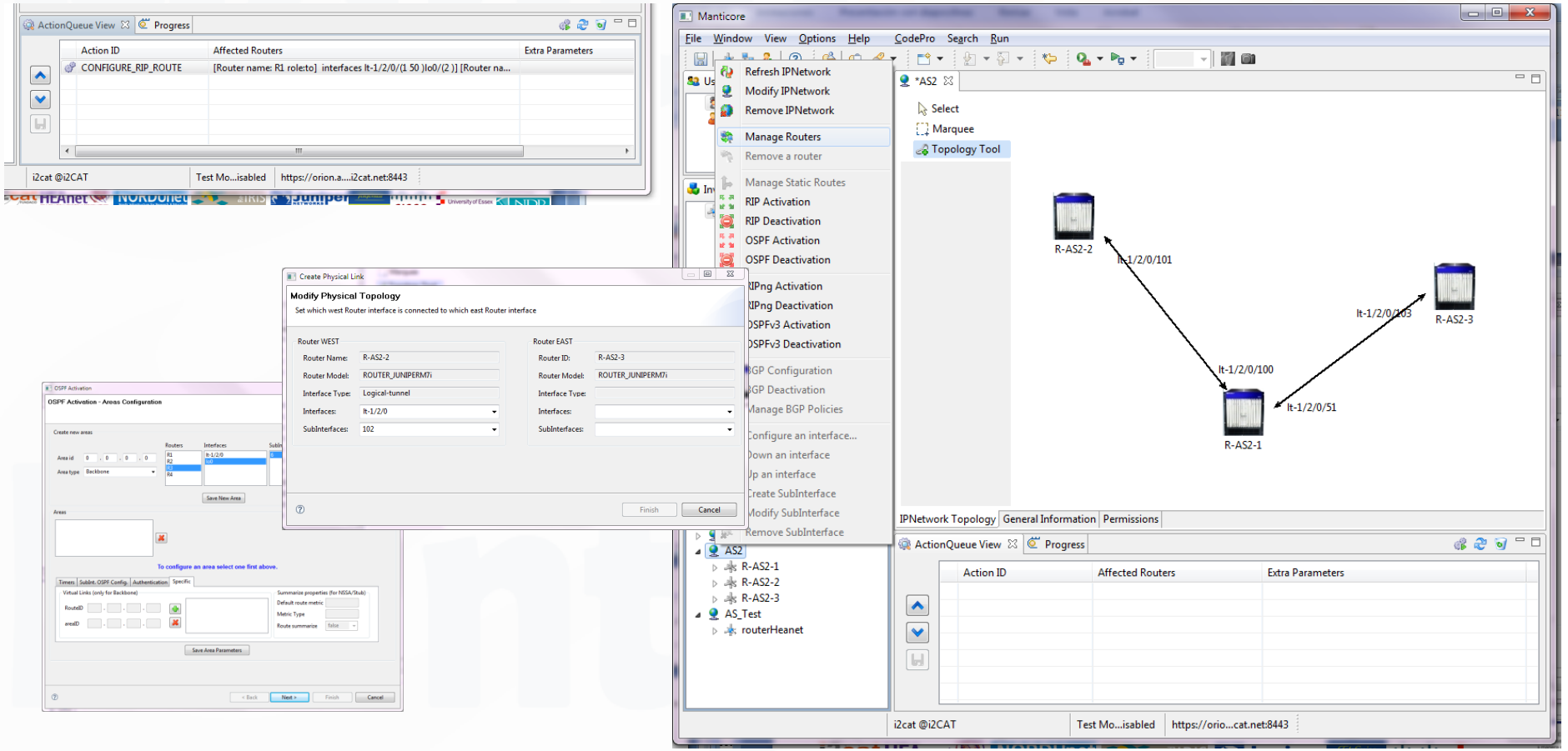
Manticore 2 architecture





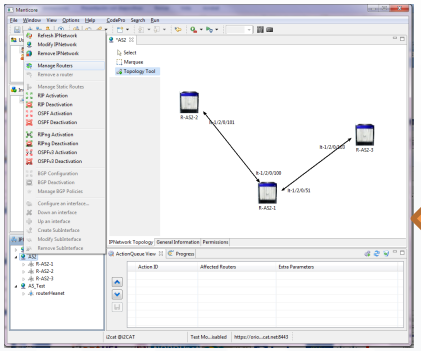
- Desktop based GUI
  - Only interface
  - Web service client.
  - Fat client.
  - One UI-fits them all.
- Main functionality exposed via two WS:
  - Router
  - IP Network
- Integrated User management and policy definition.
- Development based on GT4.

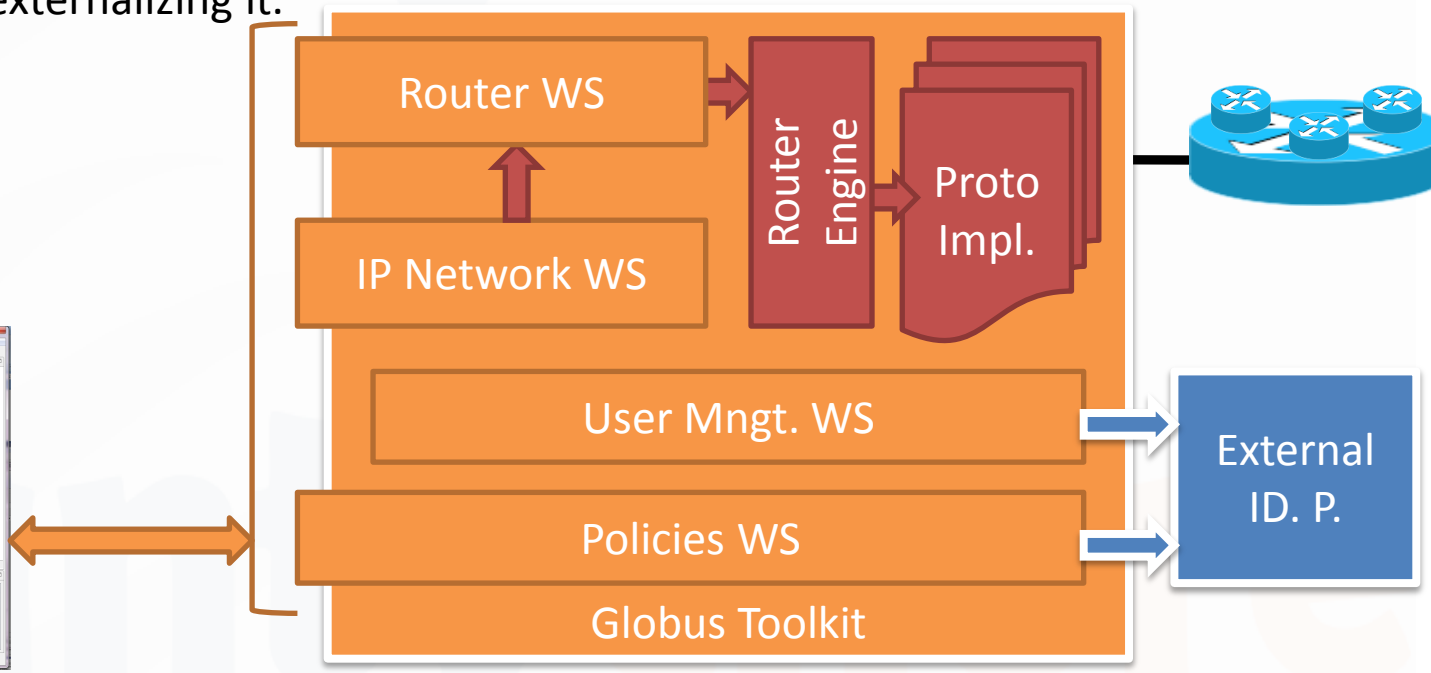
Resource Manager Center



Planned Mantychore architecture

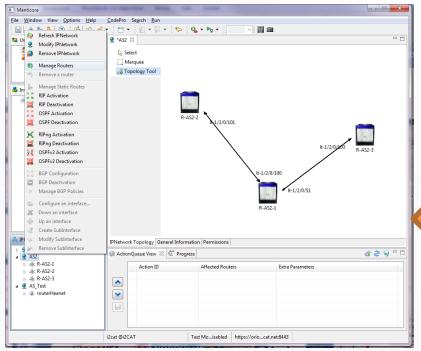
- User Management
  - Extract User Management functionalities to Mantychore's GUI.
  - Integrate with NREN's existing Identify Provider functionality.
    - EduGAIN, etc
  - This is not a core Mantychore functionality and we can reach more complex setups by externalizing it.

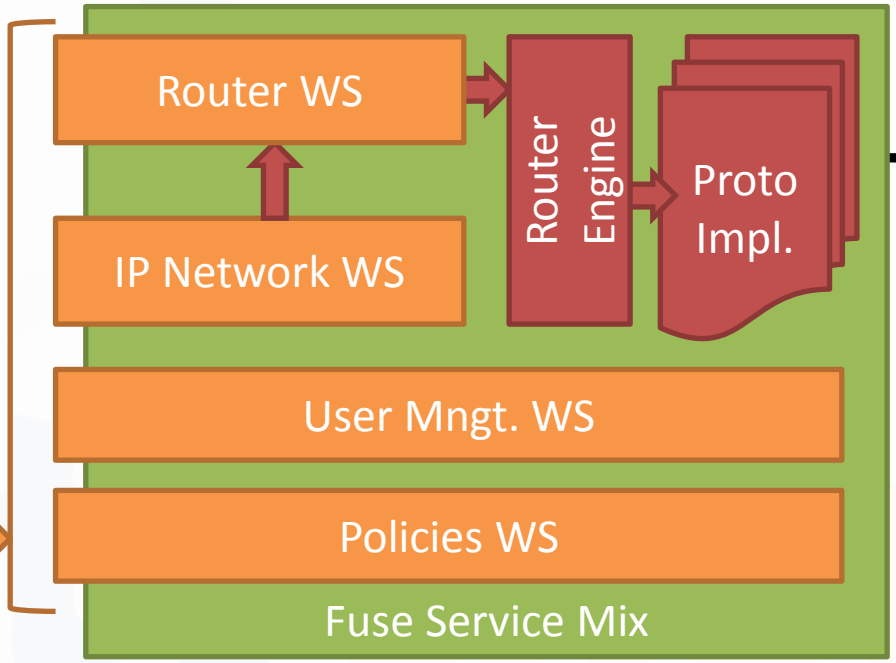




Planned Mantychore architecture

- 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.





Java SAML v2.0 FUSE certified Apache releases

Technologies

- Development

maven

spring source

Java

- Testing

JUnit.org

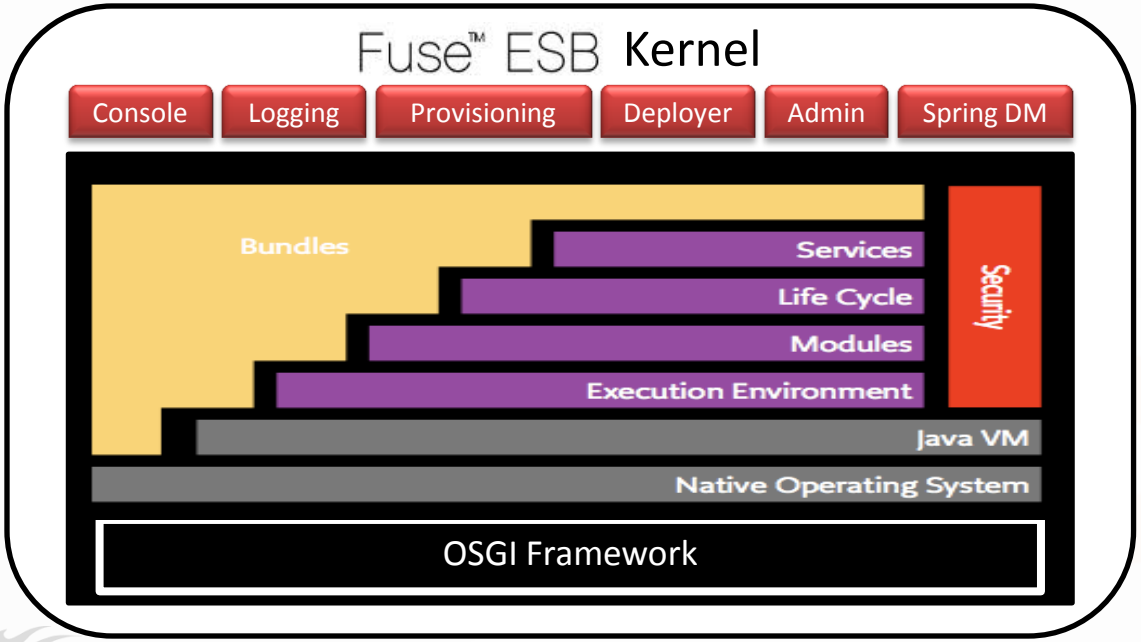
PaxExam

PaxRunner

- Security

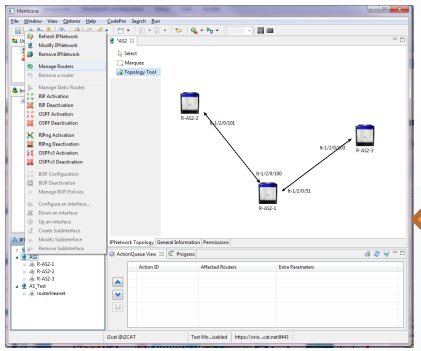
SAML v2.0

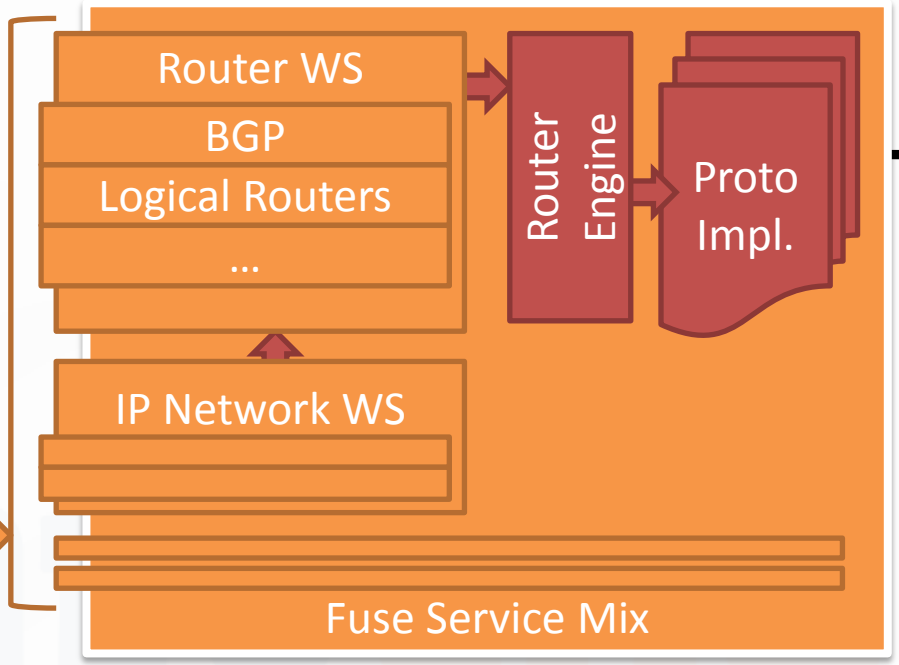
Security Assertion Markup Language



Planned Mantychore architecture

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

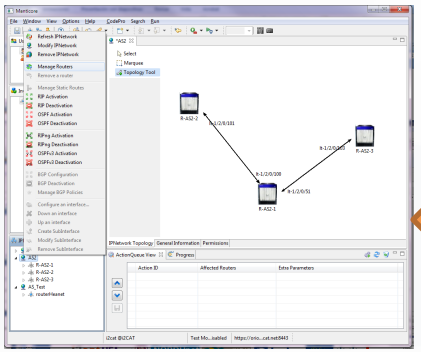


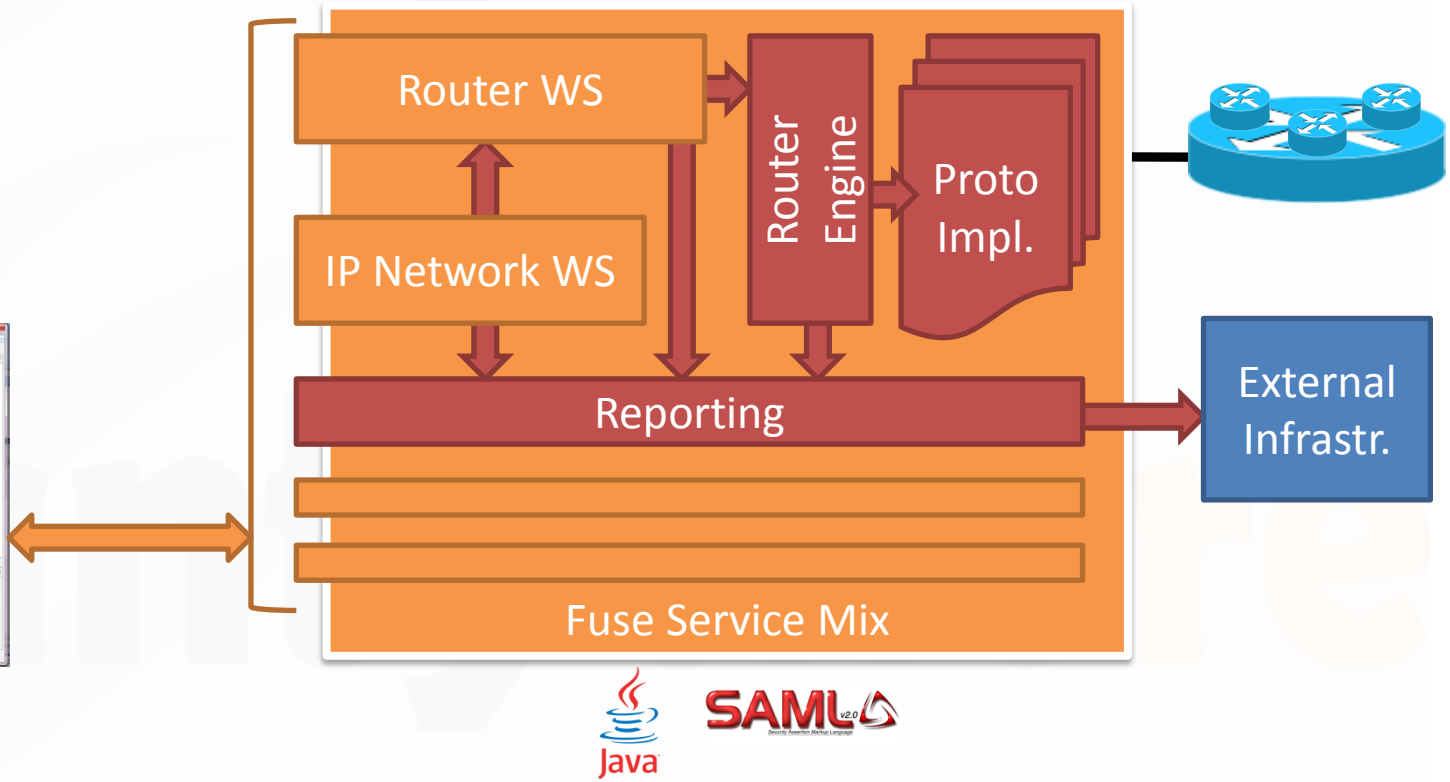


Java SAML v2.0 FUSE certified Apache releases

Planned Mantychore architecture

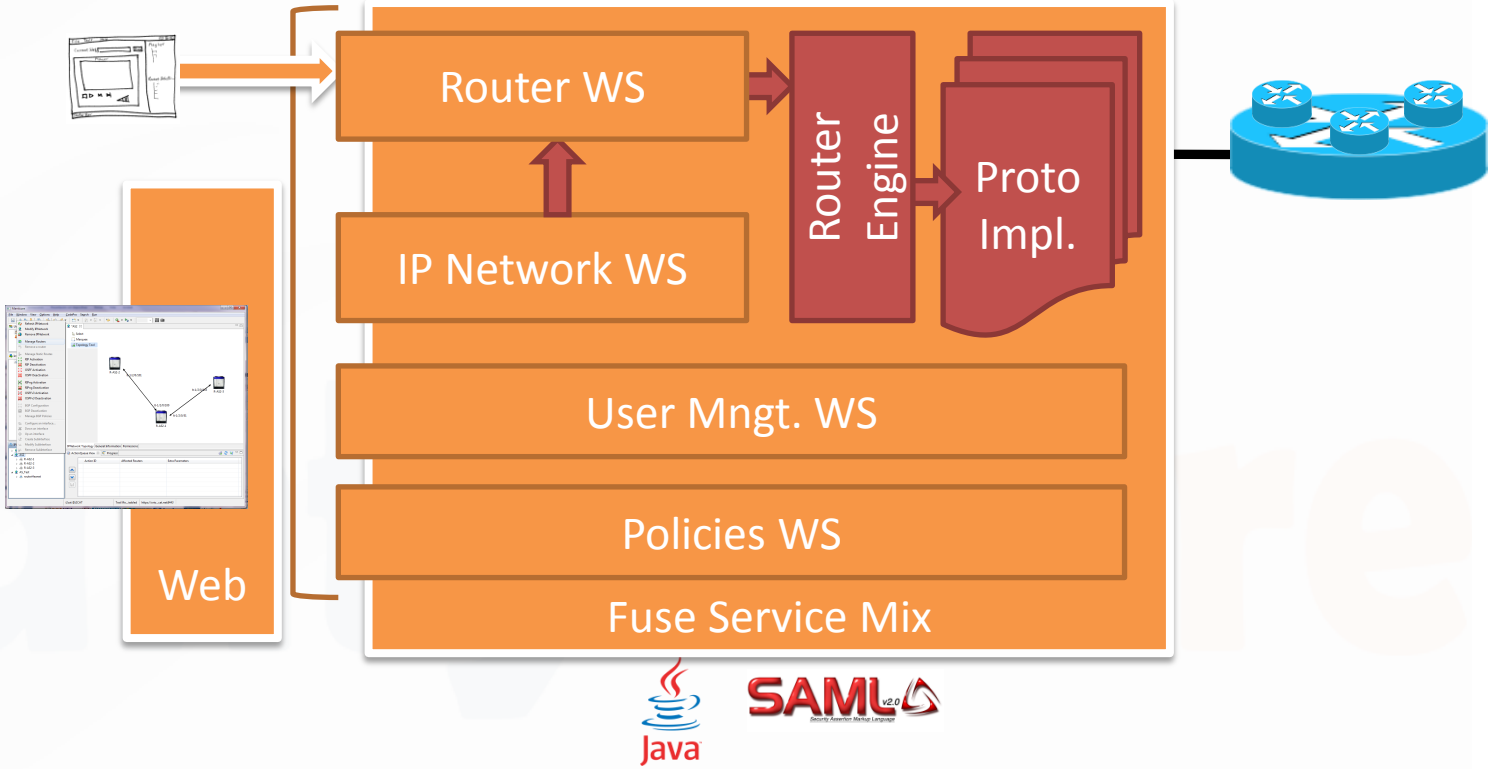
- Reporting System.
  - Better reporting of execution outcome.
  - Some use cases don't need the user to receive the error but an external role (IT department, NOC operator, etc).





Planned Mantychore architecture

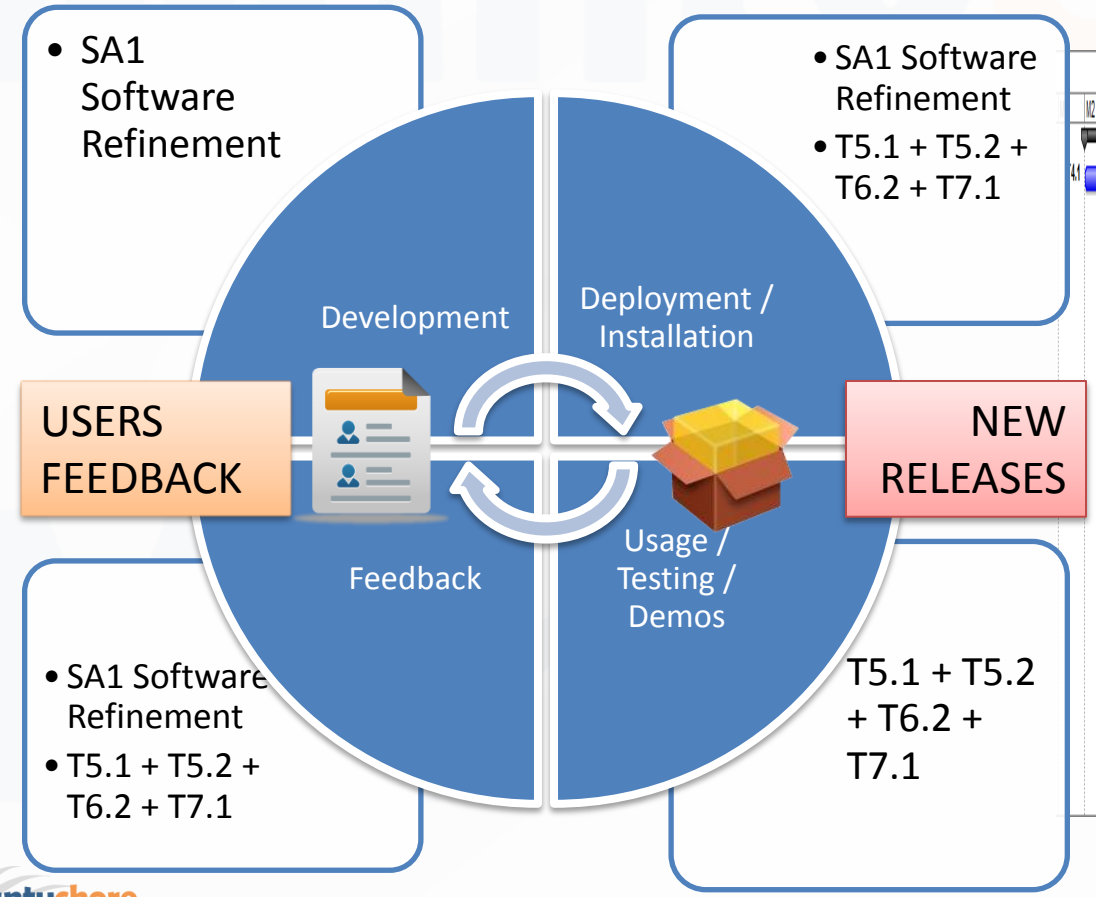
- Web based interface.
  - Main GUI will be ported to web technologies.
  - Much more streamlined update process, easier to deploy upgrades.
- Additionally simpler single Use Case interfaces will be developed.

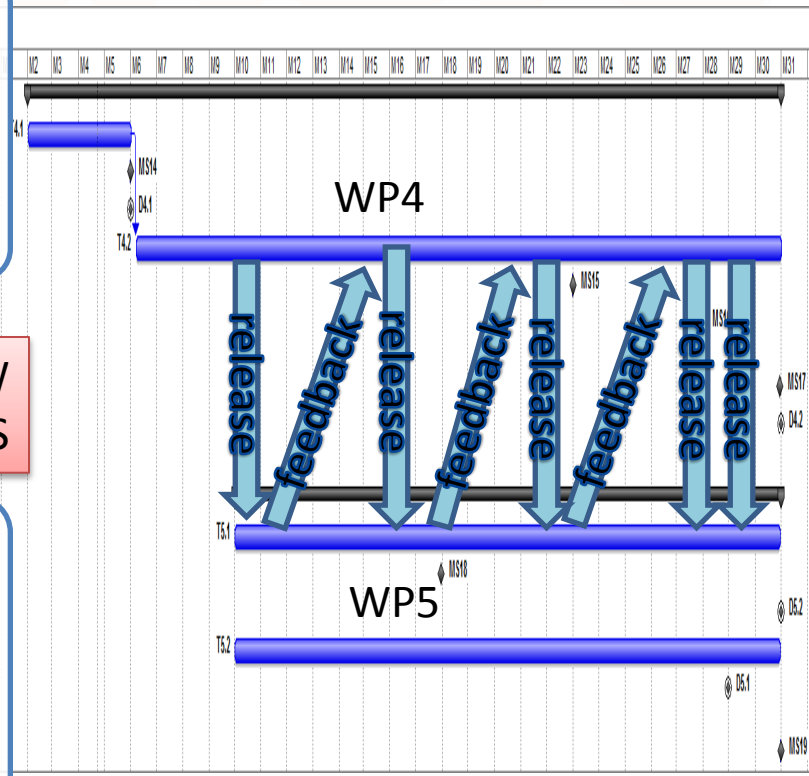


Development methodology

❑Continuous integration

Monthly release ⟷ **Periodic feedback**





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

THANKS!