

SURF
NET

Open Source DRAC

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Nortel DRAC Announcement



- In order to fully realize the potential of DRAC, to meet the needs of our R&E collaborators... and others

Nortel is announcing our intention to make DRAC available for the GLIF Community under an Open Source License

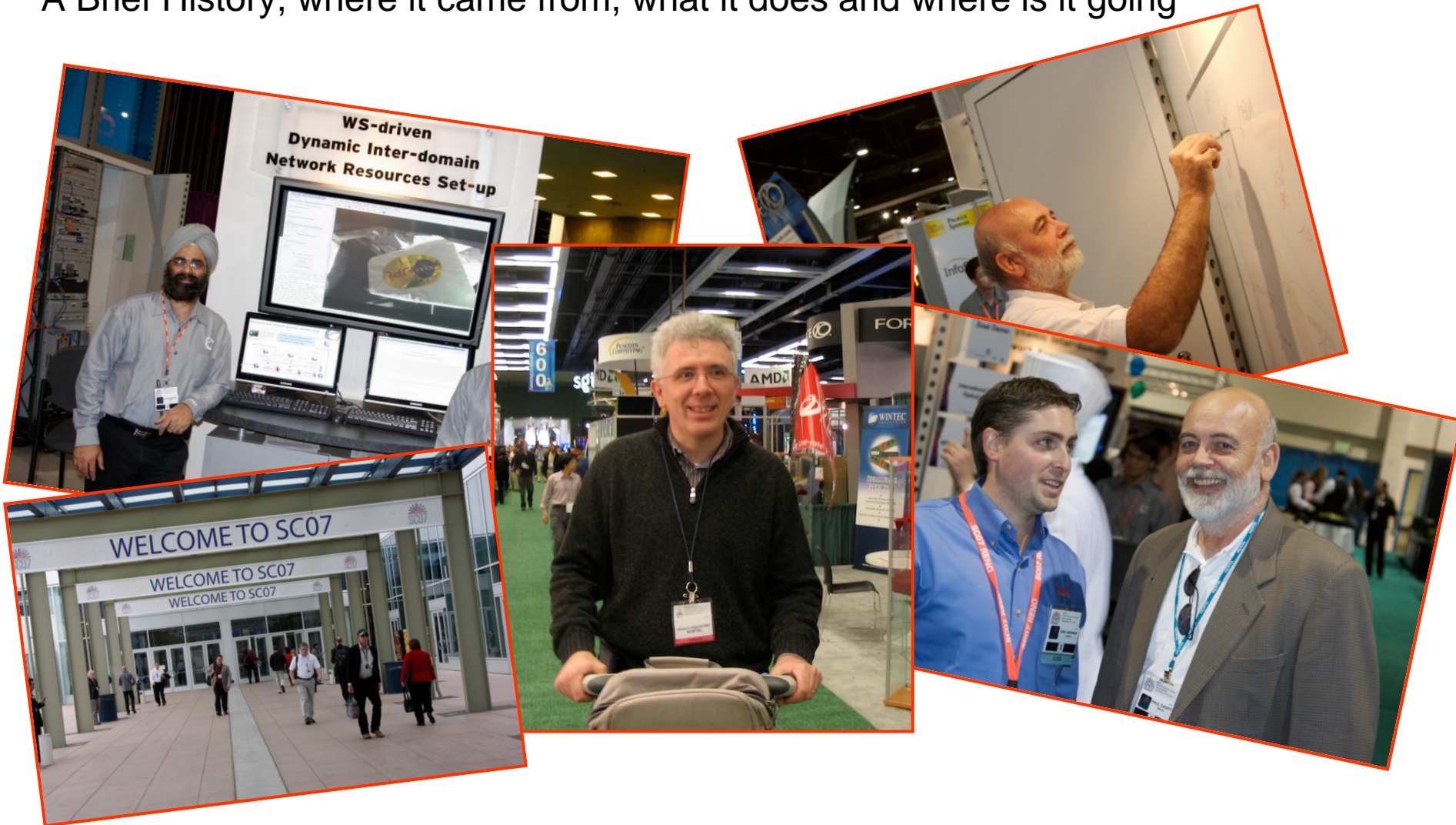
- official position is it will take 6 months
- we hope and expect to do better

Dynamic Resource Allocation control (DRAC)

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A Brief History, where it came from, what it does and where is it going



Original Concept

The Interaction between Apps and Nets

It is time for a new balancing act reflecting the increased sophistication in both application's demand and network's supply

Today

- Total separation of concerns has met portability and scalability design goals
- Applications "see" the network through peepholes like TCP CC (ubiquitous) or RAPI-like control (limited, with dialects)
- End systems and providers are latched onto independent evolution curves

Tom'w

- Applications see the net as a 1st class manageable resource (akin to cpu, storage)
- Applications exploit net info surfacing through a semi-porous layer
- Applications can directly drive net resources within an envelope
- Software constructs aptly handle polymorphism and dynamic feature introspection
- Providers move up the value chain in synergy with end systems' curve

Original Project definition

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The CO2 project

Goal: Re-define the interface between applications and network.

Applications to directly drive network resources within an envelope, while continuously absorbing custom reports on operational status.

- CO2 abstracts the network's "knobs and dials" and exposes a programmatic access to them (i.e., no point-and-click), while shielding application investments from network churn (e.g., due to different knobs, different network gear)
- CO2 acts as a virtual, "hands-free" patch-panel bridging N partitions of a data center with the M network paths to its on-demand users
- CO2 gives applications the means to schedule connectivity, define logical VPNs, monitor SLAs, receive custom notifications from the network, etc.

CO2 features includes

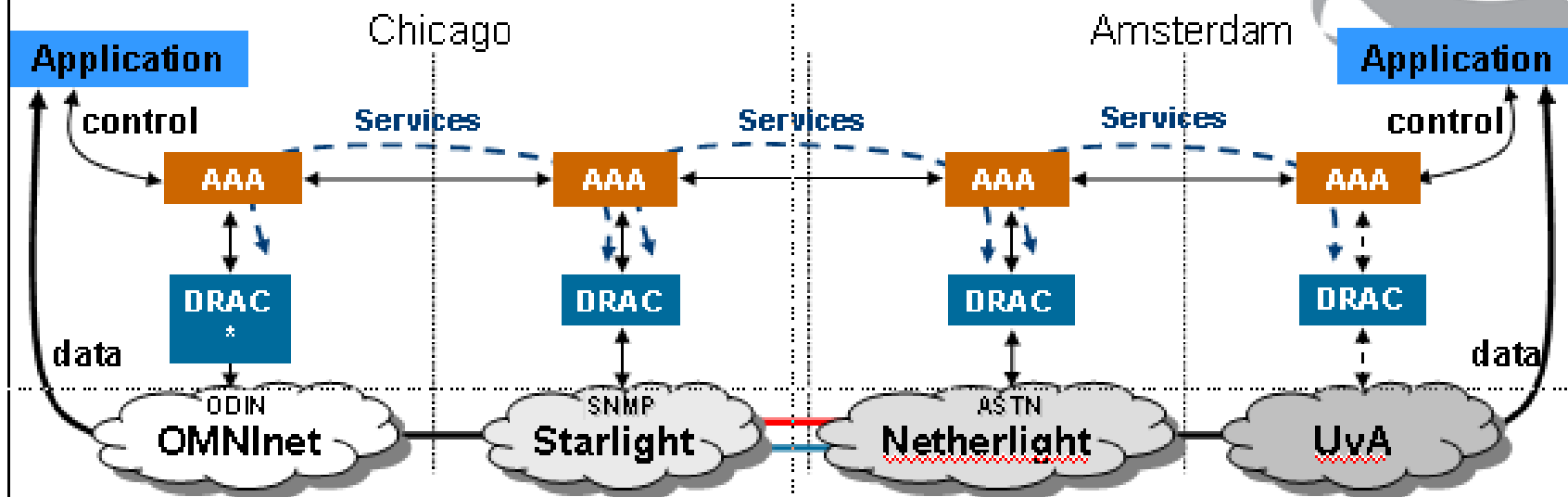
- Custom QoS management including scheduled connection service, client-operated optical VPNs, SLA monitoring and verification, differential pricing, custom error notifications, diversity formulations, bandwidth defragmentation, 3rd party scripting
- Upward de-coupling (from the application, via XML, CIM) and downward de-coupling (from the network, via pluggable signaling elements)

Early demo's

SURF

SC2004 CONTROL CHALLENGE

NORTEL
NETWORKS
BUSINESS WITHOUT BOUNDARIES



* Dynamic Resource Allocation Controller

- finesse the control of bandwidth across multiple domains
- while exploiting scalability and intra- , inter-domain fault recovery
- thru layering of a novel SOA upon legacy control planes and NEs

CANARIE
NETWORKS + COLLABORATION + RESULTS
RESEARCH + COLLABORATION + RESULTS

GigaPort

glif

ICAR

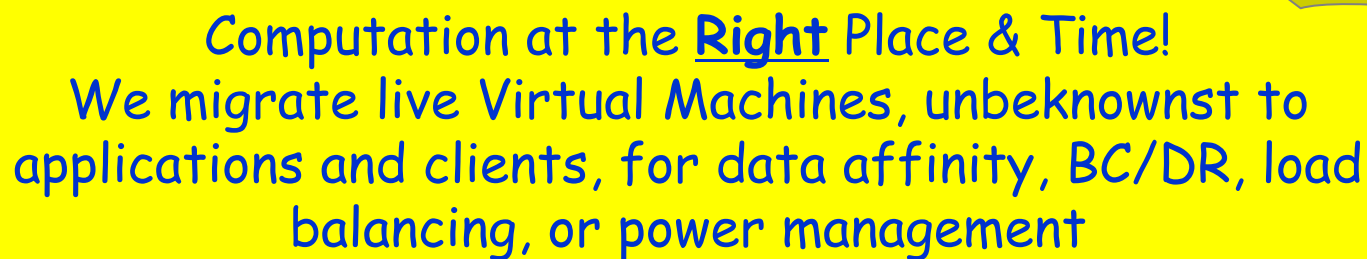
INTERNET2
www.internet2.edu

NL Light

STARLIGHT™

SURFnet

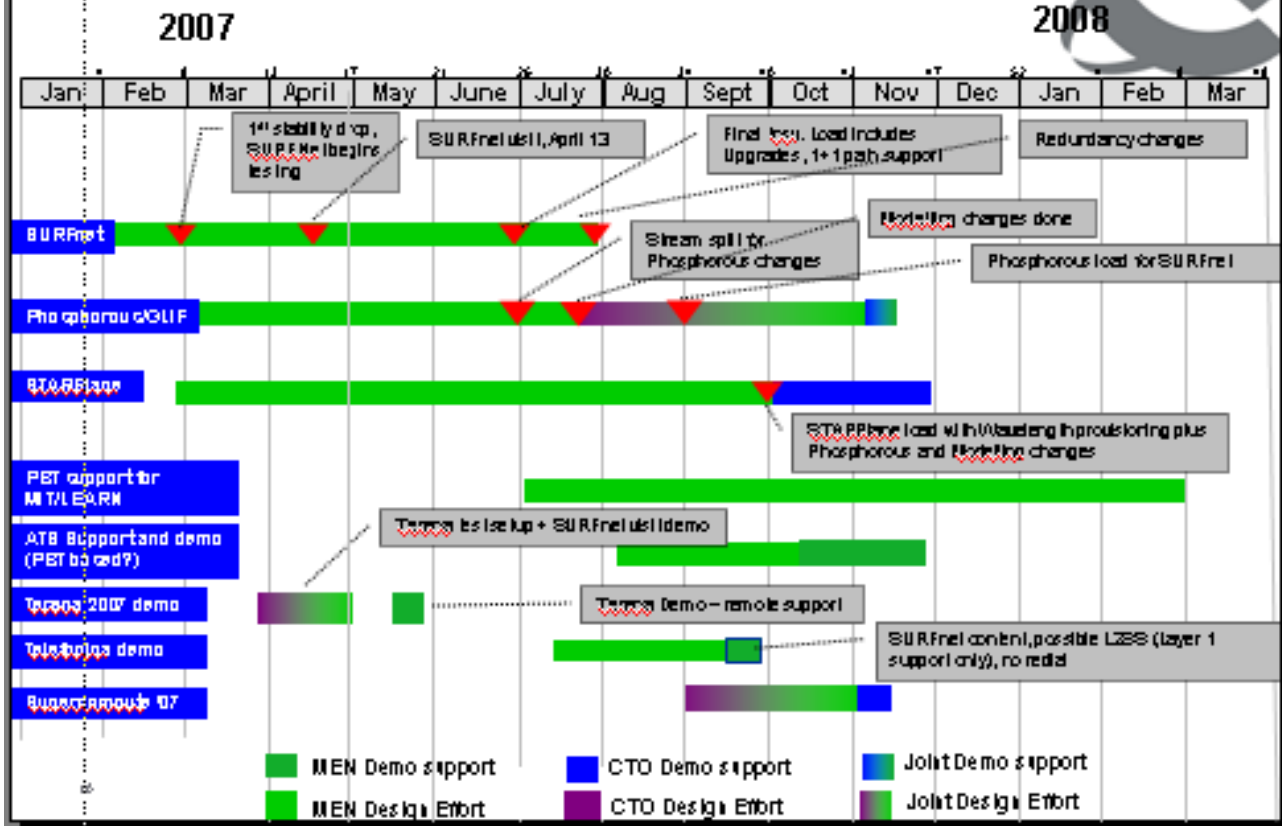
UvA **UNIVERSITEIT VAN AMSTERDAM**



2007-2008 DRAC R&D



MEN's DRAC High Level Schedule



- DRAC a key enabler for Service Oriented Applications. SOA
- A vehicle for bandwidth control and SLA enforcement
- Virtualization of Layer 0- Layer 3 services
- Creation of portable code for other platforms



SURFnet and DRAC

- Dynamic services: part of SURFnet6 2004 tender
 - "CO2" was proposed
 - Nortel developed this into DRAC
- Target: dynamic network services, available before the end of the SURFnet6 project time
- SURFnet service launched at the end of 2008
 - Operational procedures in place
 - DRAC reliable enough for a SURFnet service
- Dynamic Network Services remain core part of the future developments

What does DRAC do

“Dynamic Resource Allocation Controller”

- Abstracts network for user
- Abstracts network for application
- Allocates (network) resources
- Provides generic interface for resources
- Manage resources: access control, group management
- Has provisions for
 - Multi-layer provisioning
 - Multi-technology provisioning
 - Multi-domain provisioning

Initial operational design constraints?

Creating a manageable service

Finding the right place for management functions



Service users

- Get registered with group(s)
- Log on
- Schedule services within group
- Use service
- Verify service



Group manager

- Add users to group
- Manage selected user rights
- Get the accounting of service usage
- Request more ports!



Service manager

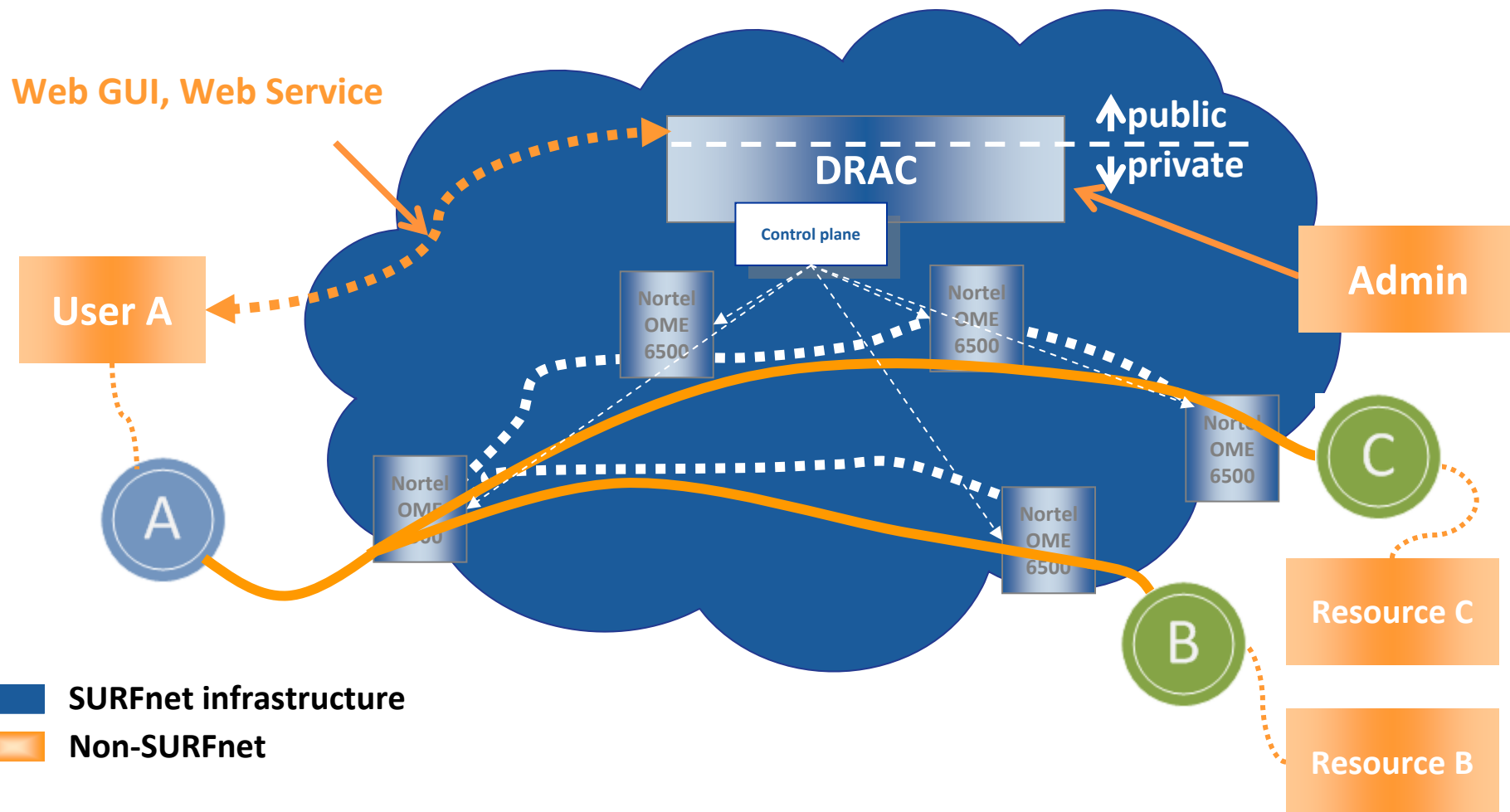
- Add network resources to DRAC
- Create groups
- Assign port resources and policy to group
- Allocate to group manager



Network operators

- Know about the service
- Manage network incidents
- Don't provision on DRAC resource!

Basic service in SURFnet



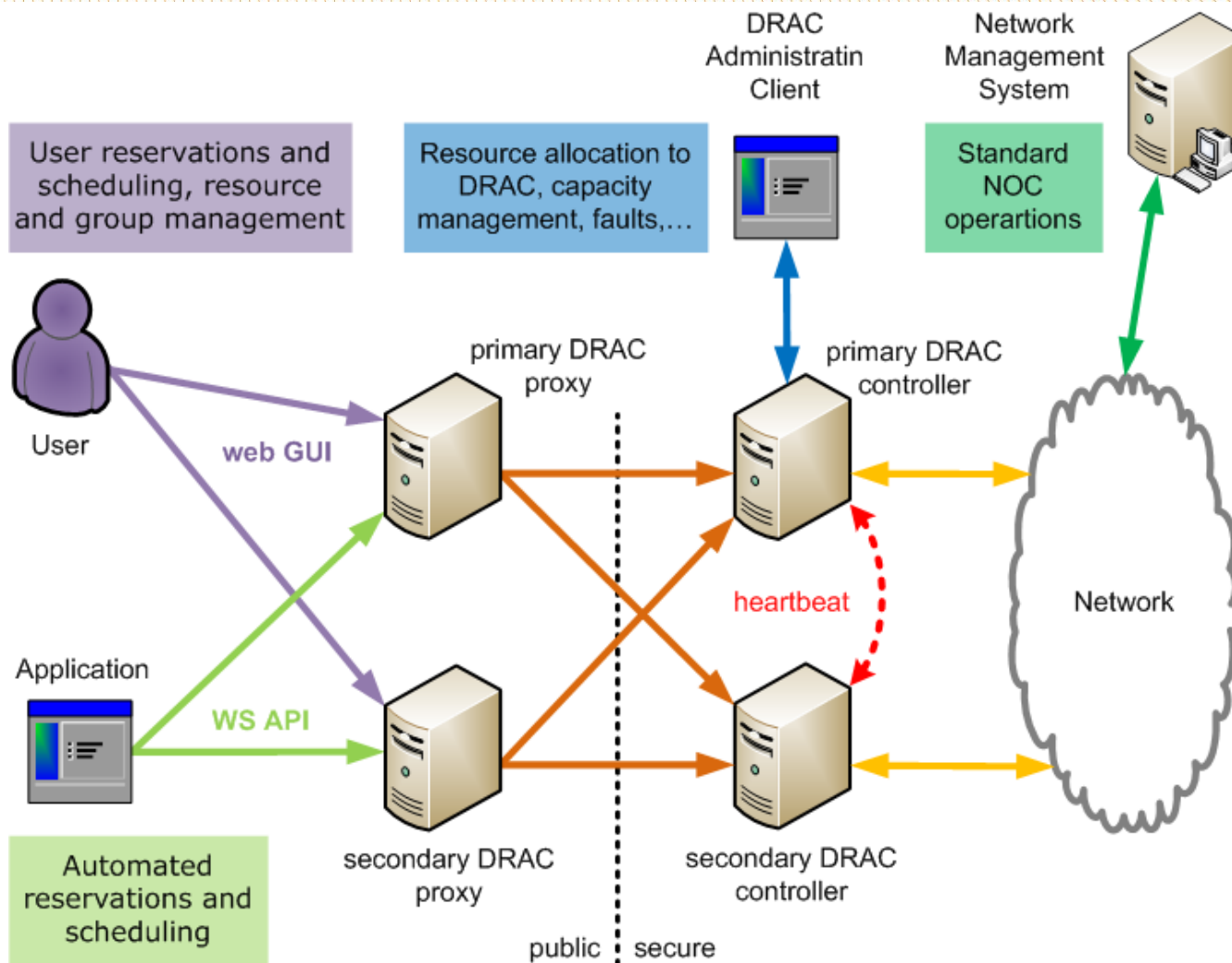


DRAC Setup

- Server-based control plane
 - No need for additional network hardware
 - Clear user-network interface
 - Simple upgrades, monitoring, bug fixing
 - Server provisions network using TL1 or SNMP
 - Added security by user access through proxy
 - Redundant proxy and controller setup

DRAC Tools and Interfaces

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Web GUI

- "Create schedule"

Name

Start and end time

Source port

Dest Port

Bandwidth

Schedule Information

Schedule Name:

Activation Type:

Billing Group:

Start Time: ☐ Start now

End Time: ☐ ∞ No end date

Service Duration: minutes

Note: The current provisioning overhead time is 30.0s, which will be reserved at the start and end of each service

Lightpath Connectivity

Source Endpoint

User Group:

Resource Group:

Site Filter:

Endpoint: Channel:

Destination Endpoint

User Group:

Resource Group:

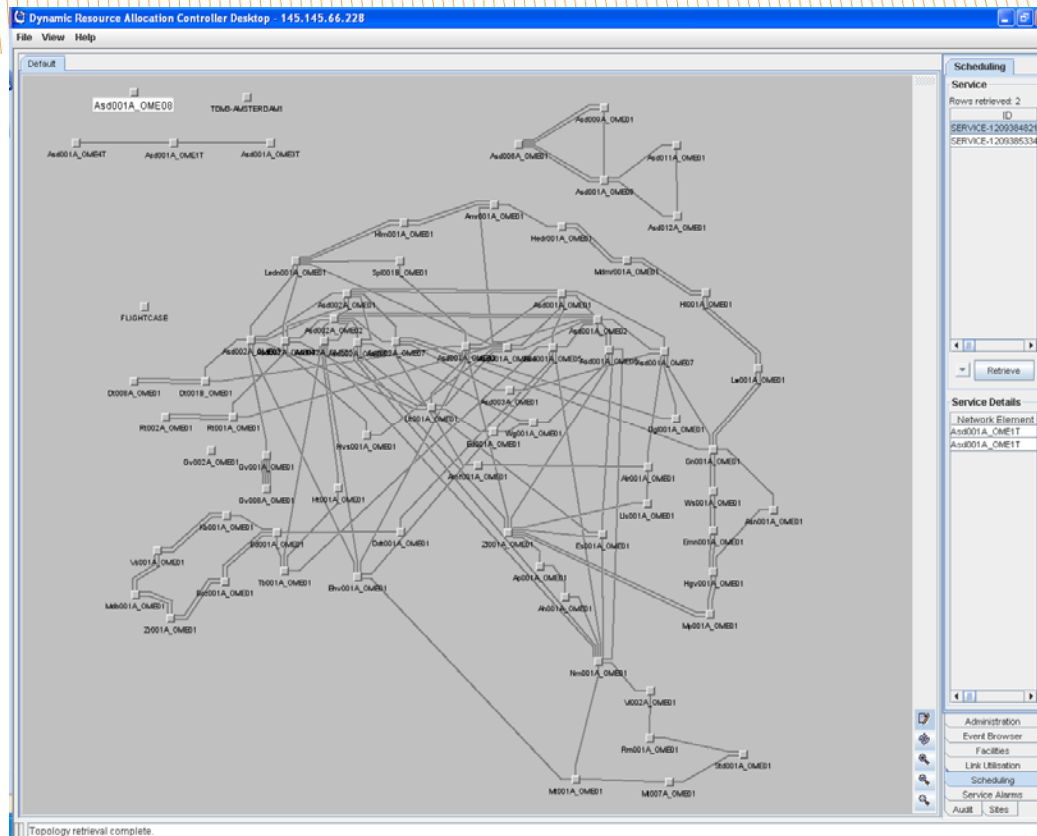
Site Filter:

Endpoint: Channel:

Rate: Mb/s

Protection Type:

Administration interface



- Separate GUI to manage network-side of the service
 - Allocate resources to DRAC
 - Check service routing on the network
 - ...



Services supported

Currently:

- Provisioning single or protected paths
 - Scheduled, repeatable, finds first timeslot,...
 - Between transparent GE (L2) ports
 - Between GE port and STM64
- Clear administrative separation from other service
 - Bandwidth management
- Group and policy management
- On Nortel OME6500 boxes
 - And proof-of-concept CPL (DWDM) control
- Has interworked in Phosphorus, with IDC,...

Next week:

- Using L2SS: VLAN to GE, VLAN to STM64
- Incorporates handles for all VLAN management

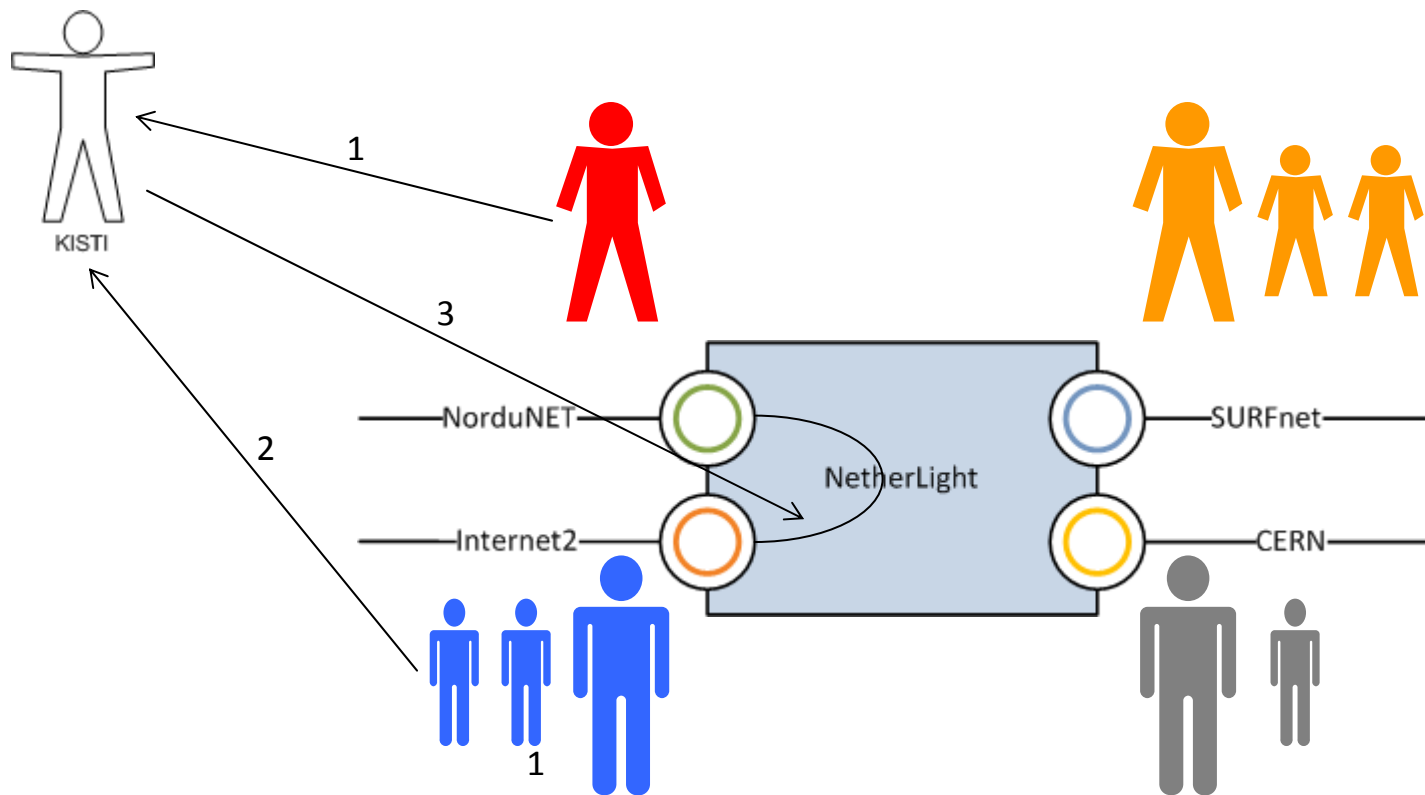
Principle: NO limitation on vendor, equipment

Group management

- Resource management essential for these services
 - What ports “belong” to whom
 - Who can connect, and for how long/much
 - “Ownership” has to be delegatable/transferable
- Network operator defines top level groups
 - Agreement level...
- Owner of groups can allow any kind of use
 - Subgroups
 - And Subgroups of subgroups...

NetherLight DGOLE Policy

Concept of User Groups



Current Approach



The Open Source concept



- Nortel is committed to making DRAC open source
 - Available to whole GLIF community
 - And beyond ;-)
- Time frame currently – officially - April
 - Need to finalize legal details (IPR etc)
 - Will be a GPL v3 licence
 - Review to ensure
 - proper front door security of web GUI and WS API
 - correct implementation of proxy-server security setup
 - Final check on potential license conflicts in source components



Open Source Community

DRAC will be “opened up”, what next?

- Collaboration platform with
 - Source code repository
 - Bug tracking system
 - Documentation WiKi
- Create a structure round it
 - Legal organisation?
 - NEW NAME
 - Managing contributions
 - Making it easy to contribute
 - Making it easy to implement
 - Managing roadmap for the community
 - Managing roadmap for the technology



Activities to precede going Open Source



- Review, approval of Nortel Business Administrators
- Code preparation in accordance with license requirements
- Security audit to ensure safe and controlled user access to the network resource.
- Documentation
 - Tutorial/Instructional Material
 - Architecture/Philosophy documentation
 - overall architecture & philosophy & history/vision
 - document/list of items to fix or improve
 - e.g. RMI vs socket messaging (currently we use a mix of both), OME control plane support, Limitations
- Define the (collaborative environment) organization of the first year



Main technology roadmap items (could be...)



- Other vendors!
- Layer 2 support
 - *VLAN support being built in at the moment*
 - Generic switch support / SNMP adapter?
 - Carrier Ethernet support? PBB-TE, MPLS-TP, MPLS,...?
- Interdomain features
 - Abstracted networks, Fenius, NSI?
- "Features"
 - Planned works management?
 - Network incidents, service monitoring?
 - Group management => federative approach
 - ...



What needs to happen

Talk to us!!!!

And have a look

<http://drac.surfnet.nl/>

User name: GLIF2009

Password: Glif2009! (capital sensitive!!)

Note: reservations can be made, will fail to provision