EUCALYPTUS

Towards an Agile Infrastructure to Provision Devices, Applications, and Networks

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WHAT IS EUCALYPTUS?

A service-oriented tool to configure and manage resources needed by users collaborating over the net.

KEY FEATURES

- Easy to configure
- Business process management
- Shared high-definition videoconference
- Service-oriented: **Web services (WS)**
- Supported by 1 to10Gb/s user-controlled Articulated Private Networks (APNs)
- Integration of the SOA with UCLPv2 and dynamically switching between APNs scenarios
- Runs on mixed layer2 and layer3 network

SUPPORTED BY USER-CONTROLLED LIGHTPATHS (UCLP) SERVICES

- Treats network resources as software objects
- End-users can provision and reconfigure lightpaths on-demand to form their own private end-to-end optical networks

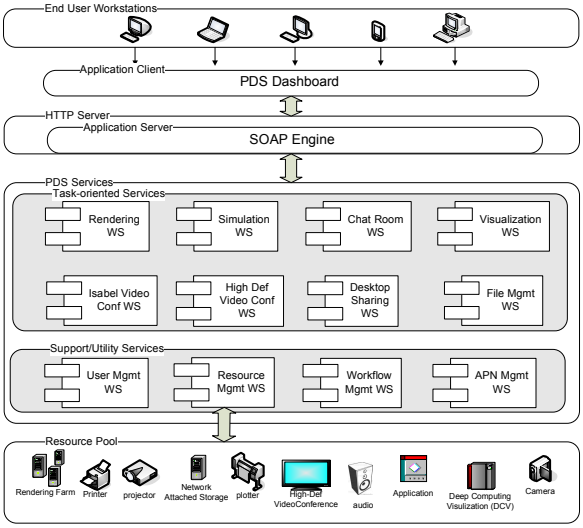
MOTIVATIONS

- Many high-end resources are not available in most labs – remote access needed
- Most end users are not IT experts
- Need to hide the tools' logistical and provisioning complexities
- Design teams are distributed in different geographical locations
- Require on-demand configuration of resources
- Require resources monitoring

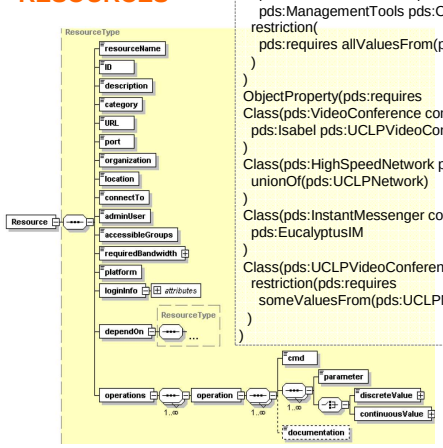
EXPECTED IMPACT

- The emergence of SOA and UCLP herald the beginning of a new age where fully collaborative multi-site design may become the norm
- The advanced network user community will benefit from the structure and function of Eucalyptus

SYSTEM ARCHITECTURE DESIGN



DESCRIPTION OF RESOURCES

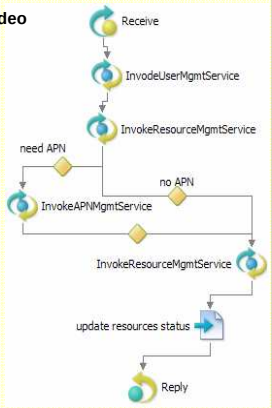



```
Class(pds:Resource partial
  unionOf(
    pds:CommunicationTool pds:VisualizationTools
    pds:ManagementTools pds:OtherResources )
  restriction(
    pds:requires allValuesFrom(pds:Resource)
  )
)
ObjectProperty(pds:requires
Class(pds:VideoConference complete
  pds:Isabel pds:UCLPVideoConference)
)
Class(pds:HighSpeedNetwork partial
  unionOf(pds:UCLPNetwork)
)
Class(pds:InstantMessenger complete
  pds:EucalyptusIM
)
Class(pds:UCLPVideoConference partial
  restriction(pds:requires
    someValuesFrom(pds:UCLPNetwork)
  )
)
```

COMPOSING WEB SERVICES INTO WORKFLOWS: AN EXAMPLE

A BPEL Workflow for a Video Conference Session

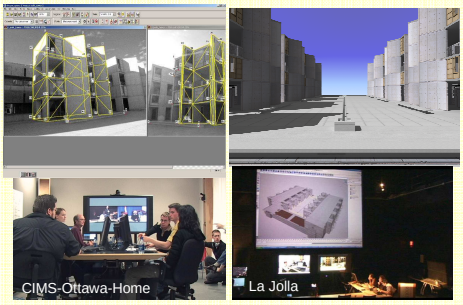
1) *Invoke User Mgmt WS to check the user's authority*
2) *Invoke Resource Mgmt WS to check resources' status and their dependencies*
3) *Invoke APN Mgmt WS if needed*
4) *Invoke Resource Mgmt WS to launch the resources*
5) *Update resources status*



ACHIEVEMENTS

- The value of Eucalyptus is recognized by users, tool vendors, system integrators and venture capitalists
- A few big companies are interested in adopting the Eucalyptus platform for their industrial environments

Eucalyptus: Collaborative Architecture Design between California and Canada -- ***Winter Simulation Conference 2006 • Monterey, California •***



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- Industrial Partners: Ploera, IBM, AutoDesk

ONGOING AND FUTURE WORK

- Streamline the process of adding new resources
- Provide Semantic descriptions for the resources
- Compose workflows based on the current tasks and network availabilities
- Monitoring and recovery
- Towards a generic middleware solution for Broadband Video Communications

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