



EUCALYPTUS (UCLP-PDS) is the creation of a disciplinary specific “Articulated Private Network” (APN) that allows users to effectively share distributed resources, assets and expertise.

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PROJECT ABSTRACT

The goal of the Eucalyptus project is to allow dispersed teams at multiple locations to collaborate and visualize in real-time by sharing computational resources, geometry data sets, and multimedia content. The expected result is development and field testing of a Service Oriented Architecture utilizing User Controlled Light Paths that has the capability to provide on-demand simultaneous and shared access to visualization, modeling, and visual communication tools. The Eucalyptus project sheds light on the value of intelligent network infrastructure to both application users and tool vendors in industries such as architecture, aerospace, defence and petroleum.

COMPONENTS OF EUCALYPTUS

- **User Controlled Light Path 2.0. (UCLP):**

UCLP software allows end-users, either people or sophisticated applications, to treat network resources as software objects and provision and reconfigure lightpaths within a single domain or across multiple, independently managed, domains.

- **Service Oriented Architecture (SOA) and Web Services (WS):**

SOA is an application architecture that invokes interfaces to accomplish coordinated tasks in which the interconnected protocols and basic processes are established by the SOA. Web Services (WS) is a way of integrating web-based applications that allows the applications to automatically interface. The UCLP provisioning Web Services allow users to dynamically assemble a set of lightpaths into a private end-to-end optical network, a so-called APN.

- **PDS Dashboard**

The Dashboard brings together modes of collaboration and tool sets that encompass and streamline all stages of the digitally mediated process in a user-friendly workspace:

Acquisition → Production → Creation → Review → Deployment/Output

- **Participatory Design Studio (PDS):**

The Participatory Design Studio is based on a highly collaborative process where the fusion of diverse data sets and massive amounts of information and large files occurs in the collaborative design process. This studio is dependent upon sophisticated modes of visualization and diverse deployment needs (immersive environments, high definition, etc.).



UCLP: “USER CONTROLLED LIGHTPATH 2.0”

- **UCLP-enabled network**
 - IP configuration and provisioning tool built around web services
 - LightPaths are allocated within the 10Gb/s Research and Education network CANet4
 - Secure, high bandwidth, low latency (1-10Gb/s)
 - “Next door” phenomenon
- **“User Controlled”**: define network topology on the fly
- **“Third generation network”**, significant paradigm shift in thinking the network
- **Utilizes a Service Oriented Architecture (SOA) approach and Web Services (WS)**
- **UCLP 2.0 and SOA/web services development aims to:**
 - Make the network transparent to the user
 - Overcome several limitations in digital mediated, distributed modes of collaboration

PDS: PARTICIPATORY DESIGN STUDIO

- Since context is increasingly distributed, global, heterogeneous work environment; multi-site collaboration requires:
 - Ease and immediacy of access
 - Sophisticated and phenomenologically rich environment
 - Technology is transparent to the user
- Distributed VISUALIZATION of large data sets to a diverse set of stakeholders at high resolution
- NETWORK and User Control of the network is essential

SOA and WS: “SERVICE ORIENTED ARCHITECTURE” AND “WEB SERVICES”

- Remote site digitization, real time interactivity, communication, monitoring, collaboration
- **Project Aim:** Development of tools, applications, groupware through content based research
- Applicability in numerous disciplines and industry
- Commercialization opportunity:
 - Services and Solution for practical application of scenario
 - Tools, middleware, groupware, visualization solutions, etc.
- New and novel mode of seeing, thinking, and making in a collaborative framework

The PDS Articulated Private Network and Dashboard

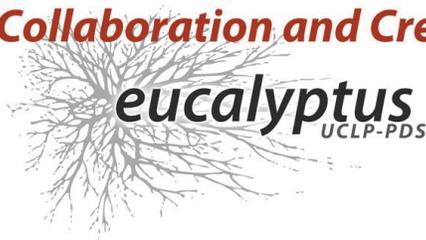
Heterogeneous APN; communication, VNC, desktop sharing, devices etc.

- **Sharing of robust assets:**
 - Real-time distributed visualization
 - Transfer of large data-sets
 - Fast access to centralized repositories of unified, up-to date project files
- **Sharing of compute-based resources:**
 - Clusters for rendering, simulation
 - Immersive environments, interactive deployment platforms
 - Devices and sensors
 - Fabrication tools
- **Sharing of expertise / decision making: high-fidelity collaborative communication tools**
 - Video Conferencing: H323, HighDef, Isabel, etc.
 - Digital whiteboards, workbenches, desktop sharing, remote/ distributed visualization

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In partnership with:**

- Communications Research Centre , (CRC); National Research Council, Institute for Information Technology (NRC-IIT) and National Research Council, Broadband Visual Communication Research Program.

Collaboration and Creation at the Speed of Light



is the creation of a disciplinary specific "Articulated Private Network" (APN) that allows users to effectively share distributed resources, assets and expertise in collaborative and creative work environments.



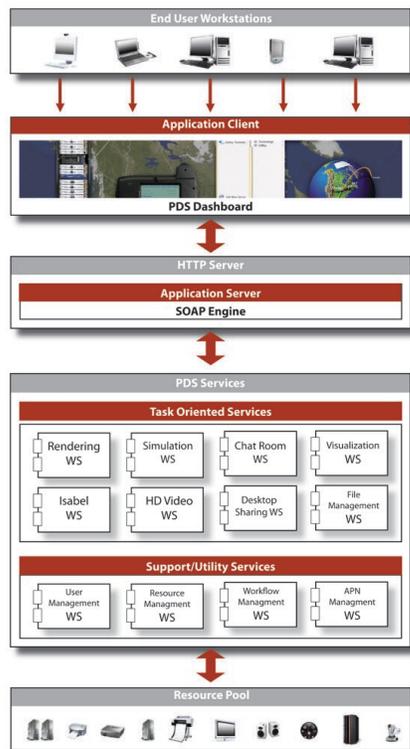
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PDS Dashboard

- The Dashboard brings together modes of Collaboration and tool sets that encompass and streamline all stages of digital mediated process:
Acquisition Production Creation Review Deployment
- Dashboard will incorporate an object based interface that will allow designers to configure and monitor the network, resources and assets.



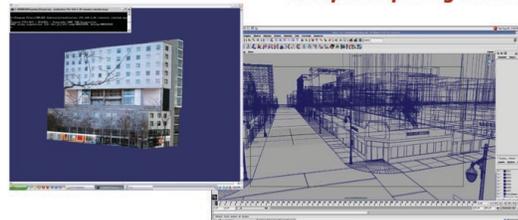
System Architecture Design

Service Oriented Architecture & Web Service

Service Oriented Architecture (SOA) and Web Services (WS) allows for a heterogeneous composition of network-enabled resources that uncouple applications and data from any specific machine or location.

- **Interoperability** – WS is platform and language independent
- **Expandability** – New Resources can be added easily
- **Allow remote access** to high end devices
- **WS for Provisioning** vs. data integration
- SOA provisioning is used to **transfer configuration parameters**, not high volume multimedia data
- **Flexibility** - Each WS is a standalone component

Deep Computing Visualization

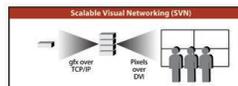


- **IBM Deep Computing Visualization (DCV)** provides a scalable, collaborative middleware infrastructure to help support and enhance the graphics functions of OpenGL software applications.
- The role of visualization in DCV is to allow organizations to gain advanced capabilities for insight into exploding data volumes, and to enable collaboration through both large scale immersive and remote visualization.

Two major components of DCV are:

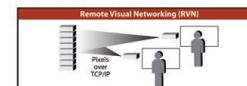
• SVN (Scalable Visual Networking)

- Increased screen resolution
- Used for high-fidelity displays and immersive environments
- Distributes high-resolution images



• RVN (Remote Visual Networking)

- Distributes graphical images to remote (collaborative) clients and end-stations
- Used for 3D visualizations over networks
- Enables collaboration



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