CoUniverse: Self-Organizing Collaborative **Environments**

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Talk Overview

CoUniverse

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Self-Organizing Collaborative Systems

- Experiences with HD video
 - manual management of large-scale installations is tedious
 - application (re)configuration
 - links reservation
 - requires careful scheduling of infrastructure
 - capacity of links
 - capacity of end-nodes
 - capacity of distribution infrastructure







Self-Organizing Collaborative Systems

- Experiences with AccessGrid, VRVS,...
 - scales to reasonable size of collaborating group
 - AG supports external applications, is extensible
 - doesn't support automatic fail-over behavior
 - doesn't support scheduling applications with bandwidth requirements close to link capacities



AccessGrid



VRVS



CESNET

CoUniverse

- CoUniverse focuses on:
 - self-organization of collaborative tools including incorportation of external tools which don't support the middleware directly
 - continuous adaptation on changing networking conditions
 - support media streams with bitrate comparable to capacity of links (including advanced stream to link scheduling)
 - built-in monitoring and visualization
 - user-empowered approach as much as possible
 - programmability and "debuggability" of the environment
 - open-source software

CoUniverse

- Network organization
 - Universe(s) for group collaboration
 - Multiverse for registration, lookup across universes
 - control plane based on P2P substrate
 - optimized for robustness
 - data plane based on native infrastructure for possible
 - optimized for maximum performance and minimum latency
- Components
 - nodes
 - applications organized into application groups
 - application group controller (AGC)
 - steer each application group
 - includes data stream scheduler



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CoUniverse

- Scheduler
 - scheduling of streams close to link capacity is hard
- Monitoring
 - control plane monitoring
 - data plane monitoring
 - application monitoring
- Visualization
 - network topology vizualization
 - active stream visualization
 - incorporation of network and application monitoring



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- Pre-alpha version of CoUniverse
 - Universe and Multiverse support, AGC
 - support for various flavors of unidirectional apps (HD @ 1.5 Gbps, HD @ 750 Mbps, HD+DXT @ 250 Mbps, HDV @ 25 Mbps, etc.)
 - scheduler for unidirectional applications
 - support for multi-point apps without scheduler (VIC, RAT, Rum, etc.)
 - simple link monitoring
 - GUI + visualization
 - + some quirks on top of it ;-)



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Thank you for your attention!

Q?/A!

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