Shongo – Orchestrating National Collaborative Infrastructure

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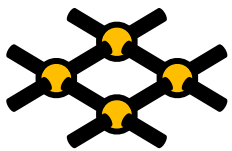
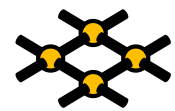


Global Video Alliance

2011–09–05

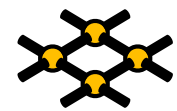


Collaborative Infrastructure of CESNET

- H.323/SIP infrastructure
  - MCUs, content servers
  - HW/SW end-points
  - uplink to GDS
- Webconferencing
  - Adobe Connect
  - open-source alternative (e.g., BigBlueButton)
- Recording and streaming infrastructure
- Interfacing to PSTN (and Skype?)
  - audio only, inbound calls from PSTN only

Collaborative Infrastructure of CESNET

- Multiple resource providers:
  - *backbone (server) infrastructure:* NREN operator (CESNET) + a few large NREN participants
  - *endpoints:* all NREN participants
- Providers need to retain their share of autonomy
  - they need to prioritize requests of their stakeholders
  - the remaining capacity may be used for peak request mitigation of other providers peak requests…
  - … but only in a way that doesn't threaten own (priority) requests



CESNET

Pilot Use Cases

- Normal allocation of a virtual room
  - if capacity of requestor's "home infrastructure" is exceeded $\Longrightarrow$ buildup of cascading with specific instructions for each client
- Co-allocation of resources
  - H.323/SIP for multipoint audio/video
  - webconferencing for multipoint data sharing
  - recording service

Pilot Use Cases

- Allocation of large event with peak capacity
  - manual approval/denial at respective resource providers if capacity request is beyond automated rule-based authorization
  - minimization of number of resources
    - MCU cascading brings concurrent license wasting
  - buildup of cascading with specific instructions for each client

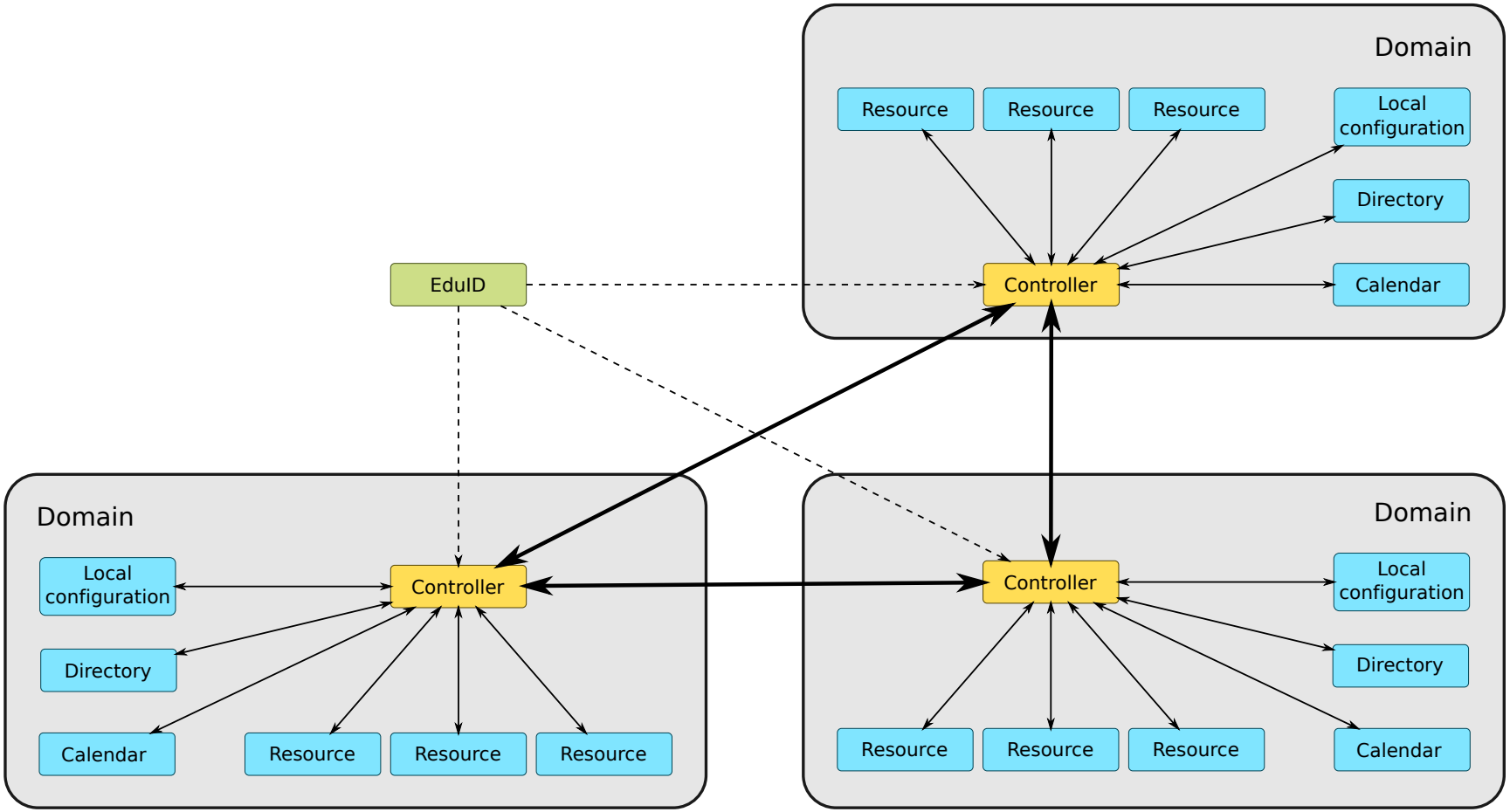
Pilot Infrastructure Elements

- Minimum set (mandatory for us) includes:
  - MCUs
    - Codian 4510
    - Codian 4515
  - recording servers
    - TANDBERG TCS
  - webconferencing servers
    - Adobe Connect
  - end points
    - Cisco/TANDBERG C Series, MXP Series
    - Polycom HDX Series
    - LifeSize Room

Shongo – Design Principles

- User-empowered approach
  - reservation of resources
  - management of reserved resources during the event
    - management of virtual room on an MCU
    - management of endpoints if desired
- Co-allocation of resources
  - interconnecting reservations (aka one “compartment”): e.g., H.323 – SIP – Adobe Connect – recording service
  - parallel reservations (aka multiple “compartments”): e.g., H.323 – SIP – recording service, Adobe Connect – recording service
- Standardization & interoperability
  - Global Video Alliance

Shongo – Architecture



Shongo – Architecture

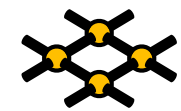
- Components
  - Controller
    - resource database
    - processor of reservation requests
    - scheduler
    - reservation database
    - inter-domain negotiation
  - Connector
    - for each device
  - User-Interfaces for the Controller
- Components communicate over a set of defined APIs

Shongo – State of Implementation

- Design documents (continuously updated)
  - Use cases and API specs
  - Domain controller design document (data model, architecture description)
- Intra-domain communication infrastructure – JADE
  - based on extensive testing
  - JADE (Java Agent Development Framework)
  - includes fail-over support
  - low overhead of communication

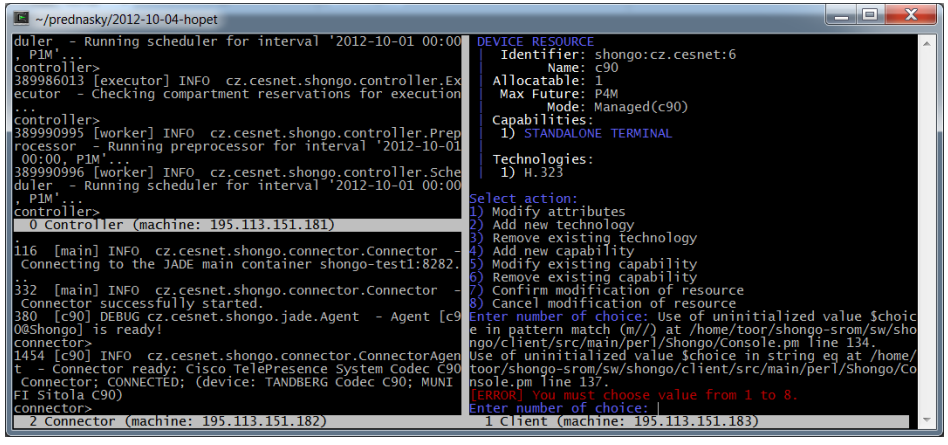
Shongo – State of Implementation

- Controller
  - first version implemented
  - implements fairly complete data model
  - simple greedy scheduler with fragmentation minimization strategy
- Clients/UI
  - command-line client implemented
- Connectors
  - working connector for Cisco/TANDBERG C90
  - working connector for Cisco/TANBERG 45xx Series MCU
  - 90% of work done on a connector for Adobe Connect



CESNET

Demo


~/prednasky/2012-10-04-hopet
duler - Running scheduler for interval '2012-10-01 00:00
, P1M'...
controller>
389986013 [executor] INFO cz.cesnet.shongo.controller.Ex
ecutor - Checking compartment reservations for execution
...
controller>
389990995 [worker] INFO cz.cesnet.shongo.controller.Prep
rocessor - Running preprocessor for interval '2012-10-01
00:00, P1M'...
389990996 [worker] INFO cz.cesnet.shongo.controller.Sche
duler - Running scheduler for interval '2012-10-01 00:00
, P1M'...
controller>
0 Controller (machine: 195.113.151.181)
116 [main] INFO cz.cesnet.shongo.connector.Connector -
Connecting to the JADE main container shongo-test1:8282.
...
332 [main] INFO cz.cesnet.shongo.connector.Connector -
Connector successfully started.
380 [c90] DEBUG cz.cesnet.shongo.jade.Agent - Agent [c9
0@Shongo] is ready!
connector>
1454 [c90] INFO cz.cesnet.shongo.connector.ConnectorAgen
t - Connector ready: Cisco TelePresence System Codec C90
Connector: CONNECTED; (device: TANDBERG Codec C90; MUNI
FI Sitola C90)
connector>
2 Connector (machine: 195.113.151.182)
DEVICE RESOURCE
Identifier: shongo:cz.cesnet:6
Name: c90
Allocatable: 1
Max Future: P4M
Mode: Managed(c90)
Capabilities:
1) STANDALONE TERMINAL
Technologies:
1) H.323
Select action:
1) Modify attributes
2) Add new technology
3) Remove existing technology
4) Add new capability
5) Modify existing capability
6) Remove existing capability
7) Confirm modification of resource
8) Cancel modification of resource
Enter number of choice: Use of uninitialized value $choic
e in pattern match (m//) at /home/toor/shongo-srom/sw/sho
ngo/client/src/main/perl/Shongo/Console.pm line 134.
Use of uninitialized value $choice in string eq at /home/
toor/shongo-srom/sw/shongo/client/src/main/perl/Shongo/Co
nsole.pm line 137.
[ERROR] You must choose value from 1 to 8.
Enter number of choice:
1 Client (machine: 195.113.151.183)

Thank you for your attention!

This effort is supported by LM2010005 project.