GENI Intl. Session: Research update from UvA.

Cees de Laat

EU

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SURFnet

NLESC

TNO

NWO/ncf
We investigate: for complex networks!
LinkedIN for Infrastructure

- From semantic Web / Resource Description Framework.
- The RDF uses XML as an interchange syntax.
- Data is described by triplets (Friend of a Friend):

Subject → Predicate → Object

- Location
  - name
  - connectedTo

- Device
  - description
  - capacity

- Interface
  - locatedAt
  - encodingType

- Link
  - hasInterface
  - encodingLabel
Path between interfaces A1 and E1:
A1-A2-B1-B4-D4-D2-C3-C4-C1-C2-B2-B3-D3-D1-E2-E1

Scaling: Combinatorial problem
Information Modeling

Define a common information model for **infrastructures** and **services**. Base it on Semantic Web.

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**Infrastructures and Services**

- **Infrastructure**
- **Service**
- **Device**
- **Group**
- **Cluster**
- **Node**
- **Exchange**

- **Projector**
  - `pixelsX`
  - `pixelsY`

- **Display**
  - `pixelsX`
  - `pixelsY`

- **Host**
  - `hostName`
  - `OS`

- **Host Name**

- **Storage Service**
  - `totalDiskSpace`
  - `freeDiskSpace`

- **Stream Service**
  - `capabilities`
  - `maxStreams`

- **Display Service**
  - `pixelsX`
  - `pixelsY`

- **NTT Display Service**

- **SAGE Display Service**

- **NFS Storage Service**

- **iRODS Storage Service**

- **SS Display Service**

- **NTT Stream Service**

- **SAGE Stream Service**

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**References**

- J. van der Ham, F. Dijkstra, P. Grosso, R. van der Pol, A. Toonk, C. de Laat
  *A distributed topology information system for optical networks based on the semantic web*, In: Elsevier Journal on Optical Switching and Networking, Volume 5, Issues 2-3, June 2008, Pages 85-93

- R. Koning, P. Grosso and C. de Laat
“Show Big Bug Bunny in 4K on my Tiled Display using green Infrastructure”

- Big Bugs Bunny can be on multiple servers on the Internet.
- Movie may need processing / recoding to get to 4K for Tiled Display.
- Needs deterministic Green infrastructure for Quality of Experience.
- Consumer / Scientist does not want to know the underlying details.
  ➤ His refrigerator also just works.
Cloud Computing

Domain Apps

Service Plane

- eScience Middleware
- + ML + reasoning (ProLog?) + Scheduling + ...

Domain Apps

- Domain Apps
- Domain Apps
- Domain Apps

SAGE
- CGLX
- Cromium

OCCI
- JSDL
- SAGA

GIR
- UR

NSI
- NetConf
- SNMP

OpenFlow

PerfSonar

DIAS
- ByteIO
- iRODs

OGSA

WebServ

Cloud

Computing
ECO-Scheduling

What type of route should be planned?

- Fastest route
- Eco route
- Shortest route
- Avoid motorways
- Walking route
In the Intercloud virtual servers and networks become software

- Virtual Internets adapt to the environment, grow to demand, iterate to specific designs
- Network support for application specific interconnections are merely optimizations: Openflow, active networks, cisco distributed switch
- But how to control the control loop?
Interactive Networks

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Q & A

I did not talk about:
- CineGrid, digital Cinema on CI
- Knowledge complexity
- Security & privacy
- AAA
- ...

http://ext.delaat.net/

Slides thanks to:
- Paola Grosso
- Sponsors see slide 1. 😊
- SNE Team & friends, see below