

GreenSonar

BOF

co-presenters's:
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Inder Monga

GGF36, Chicago, Oct 2012

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Agenda

Wednesday Oct. 10th, 10h30 – 11h00

- Agenda Bashing
- Proposal
- Leadership
- Any Other Subject
- Adjourn



Turn Green Tech into Greenbacks

IT Certifications for Jobs That Make a Difference



Uptime Institute Accredited Tier Designer

The Uptime Institute has long been a proponent for green data center design and implementation. Its certification course on data center design embeds green principles into the curriculum.

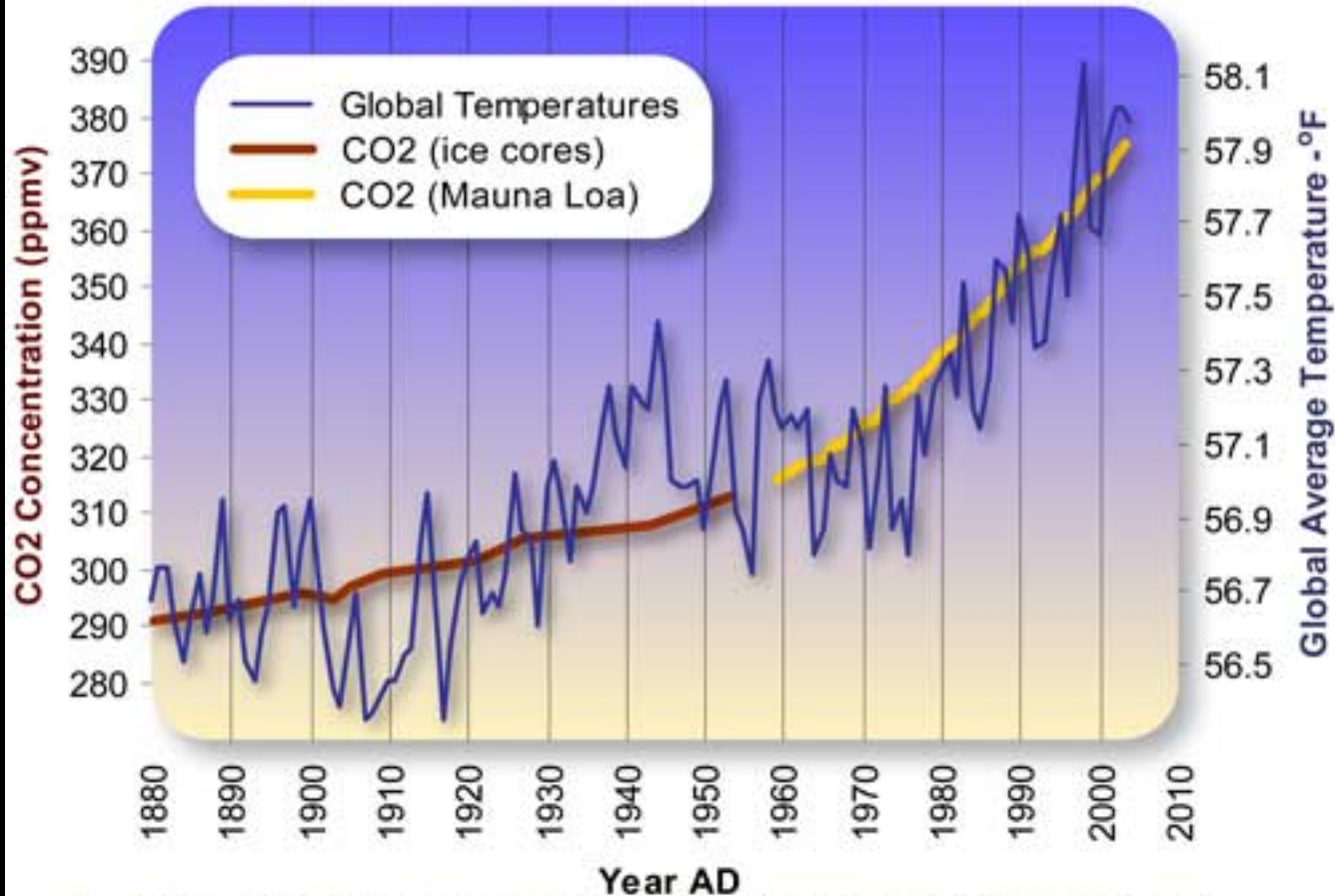


SUSTAINABILITY
Your Career



Need for GreenIT

Global Average Temperature and Carbon Dioxide Concentrations, 1880 - 2004



Data Source Temperature: ftp://ftp.ncdc.noaa.gov/pub/data/anomalies/annual_land_and_ocean.ts

Data Source CO2 (Siple Ice Cores): <http://cdiac.esd.ornl.gov/ftp/trends/co2/siple2.013>

Data Source CO2 (Mauna Loa): <http://cdiac.esd.ornl.gov/ftp/trends/co2/maunaloa.co2>

Graphic Design: Michael Ernst, The Woods Hole Research Center



Need for GreenIT

Positive proof of global warming.



**18th
Century**

1900

1950

1970

1980

1990

ECO-Scheduling



The Ten Problems with the Internet

- 1. Energy Efficient Communication**
2. Separation of Identity and Address
3. Location Awareness
4. Explicit Support for Client-Server Traffic and Distributed Services
5. Person-to-Person Communication
6. Security
7. Control, Management, and Data Plane separation
8. Isolation
9. Symmetric/Asymmetric Protocols
10. Quality of Service

Nice to have:

- Global Routing with Local Control of Naming and Addressing
- Real Time Services
- Cross-Layer Communication
- Multicast
- Receiver Control
- Support for Data Aggregation and Transformation
- Support for Streaming Data
- Virtualization

GreenSonar BOF

- Sustainability requires Green-IT in all kinds of resources, compute, network, storage, sensor, ...
- Measure to know; information needed for smart infrastructure.
- Basic idea: been there done that in Networking!
- Why not apply NM & PerfSonar methods and architecture to Green & Energy information?
- Need also application information.
- Big hurdle: energy metrics on heterogeneous resources
- BOF/Charter meeting at OGF36, Chicago.

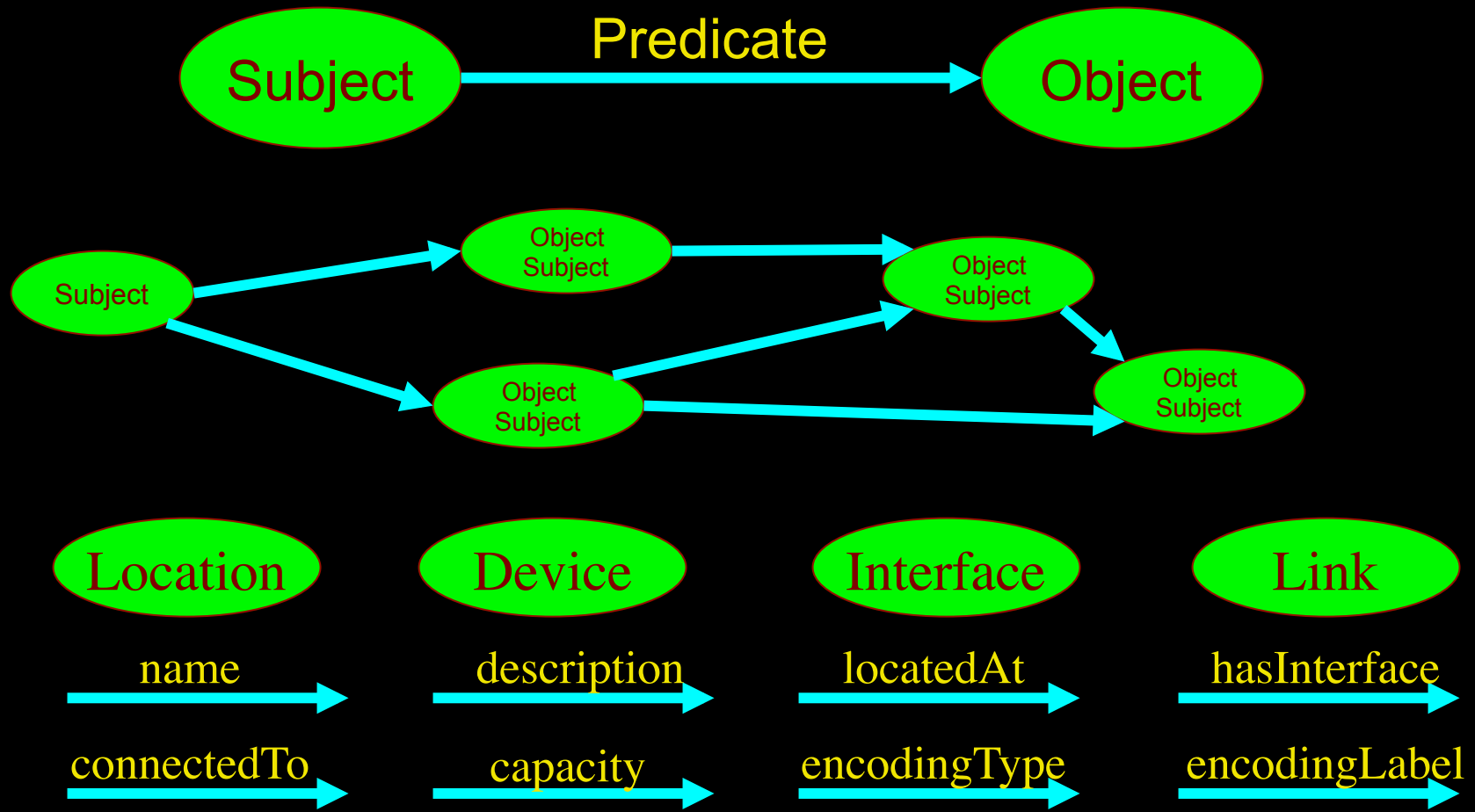
Approach

- Define metrics
- Extend xDL with GreenDL
- GreenSonar
- Measure & publish
- Build data base -> information base
- Machine Learn good/bad practices
- Reason & Select & Schedule

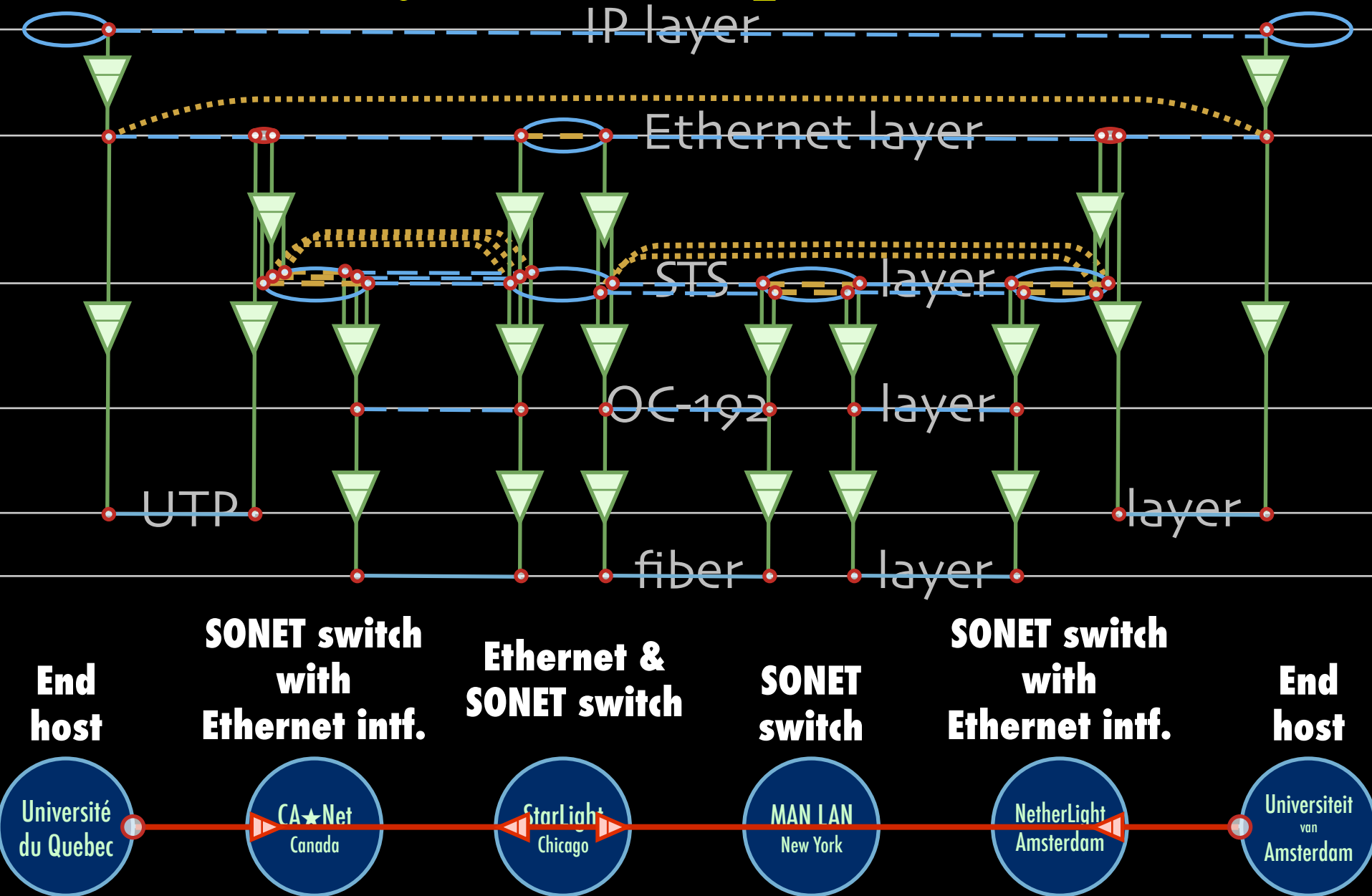
LinkedIn for Infrastructure



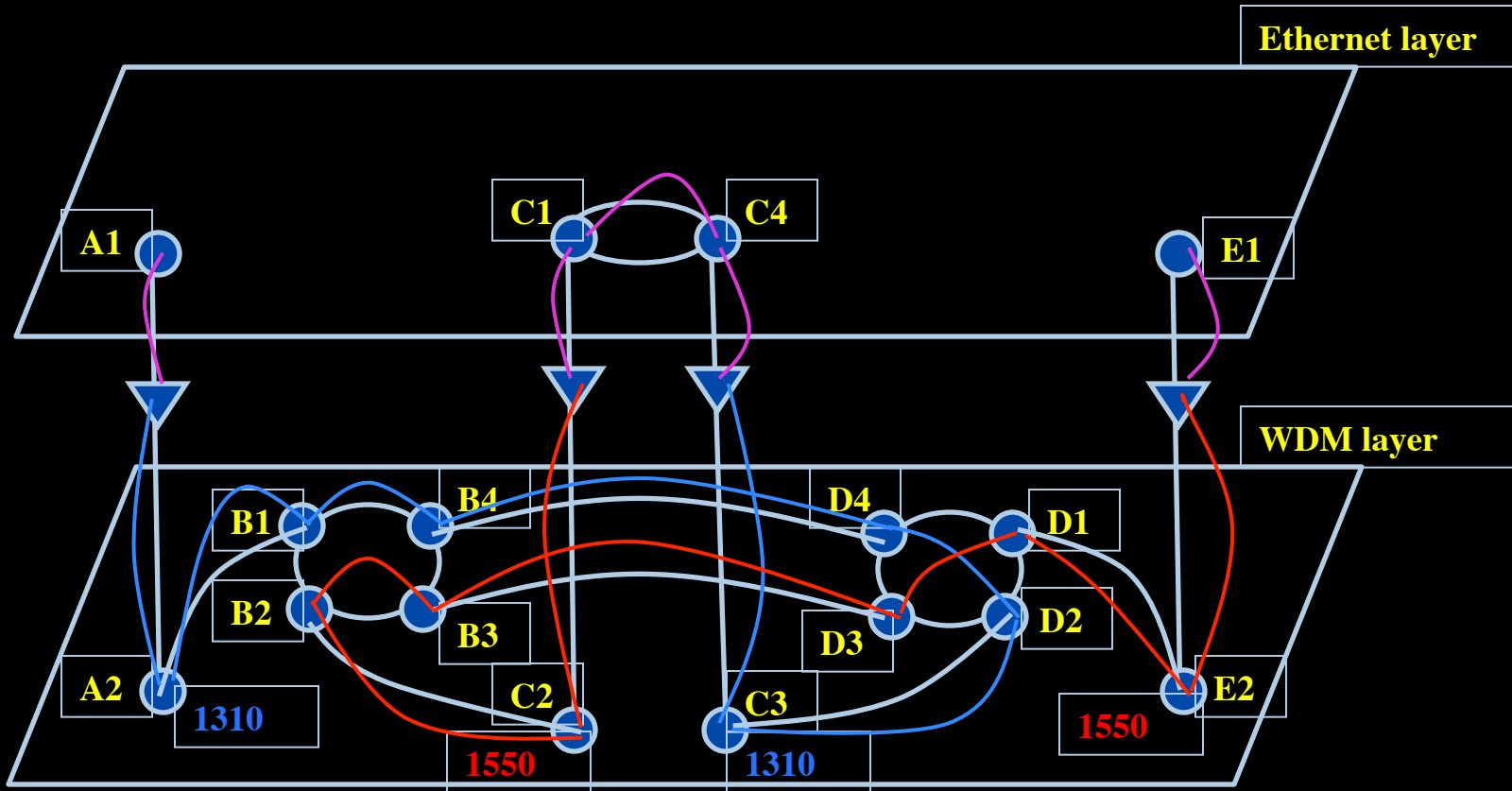
- From semantic Web / Resource Description Framework.
- The RDF uses XML as an interchange syntax.
- Data is described by triplets (Friend of a Friend):



Multi-layer descriptions in NDL



Multi-layer Network PathFinding



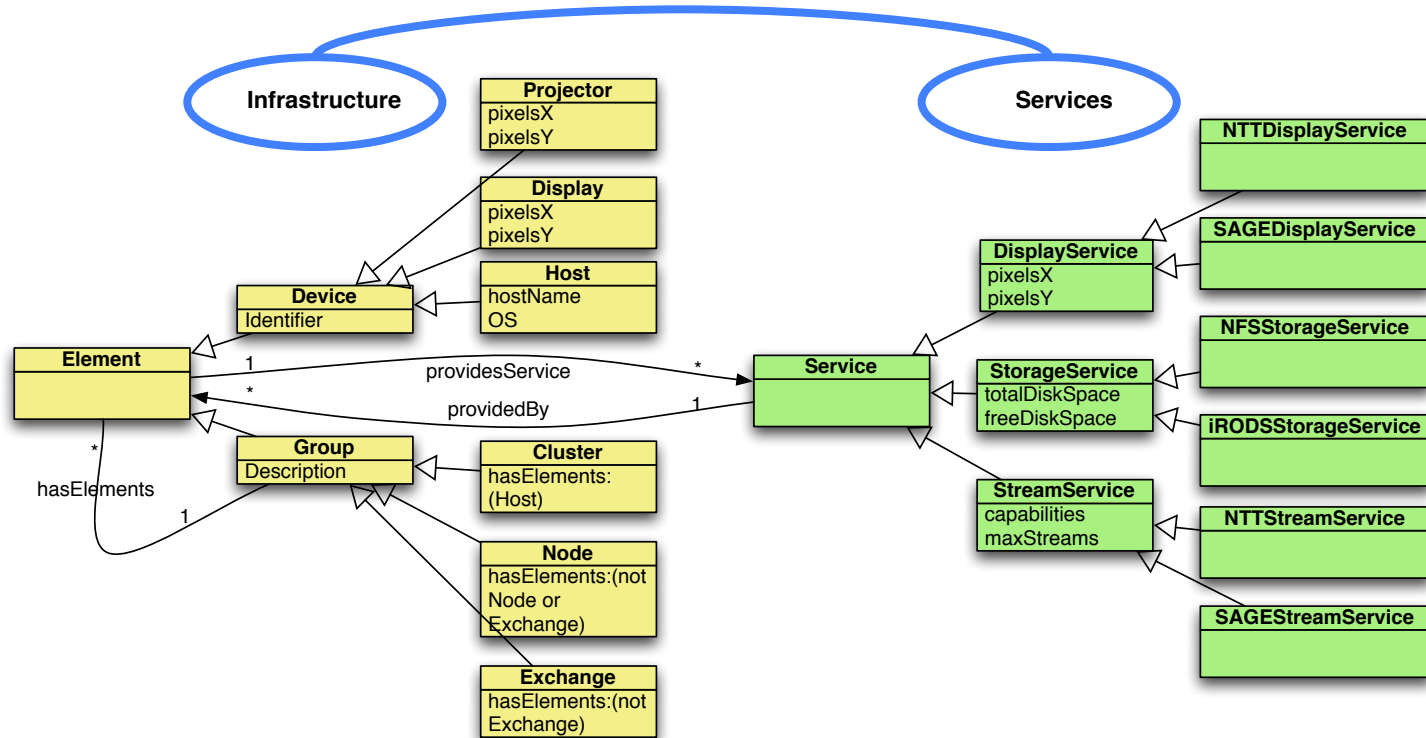
Path between interfaces A1 and E1:

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.

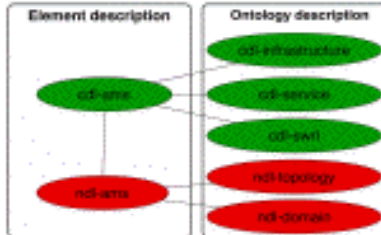


CineGrid is an initiative to facilitate the exchange, storage and display of high-quality digital media.

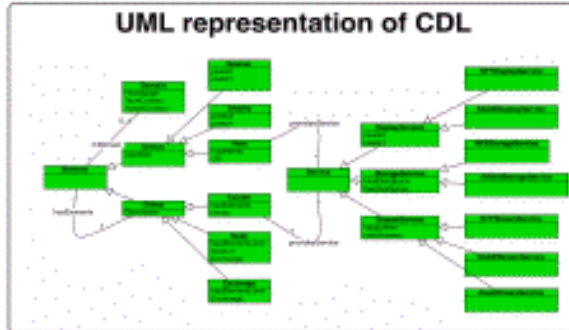
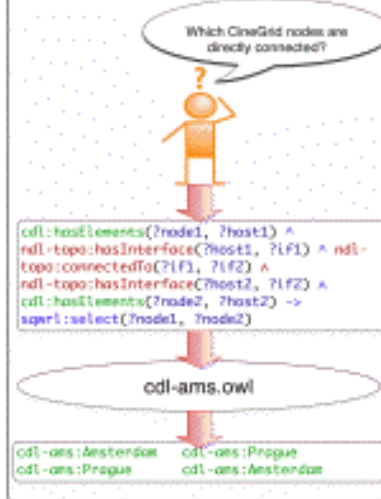
The CineGrid Description Language (CDL) describes CineGrid resources. Streaming, display and storage components are organized in a hierarchical way.

CDL has bindings to the NDL ontology that enables descriptions of network components and their interconnections.

With CDL we can reason on the CineGrid infrastructure and its services.



SQWRL is used to query the Ontology.

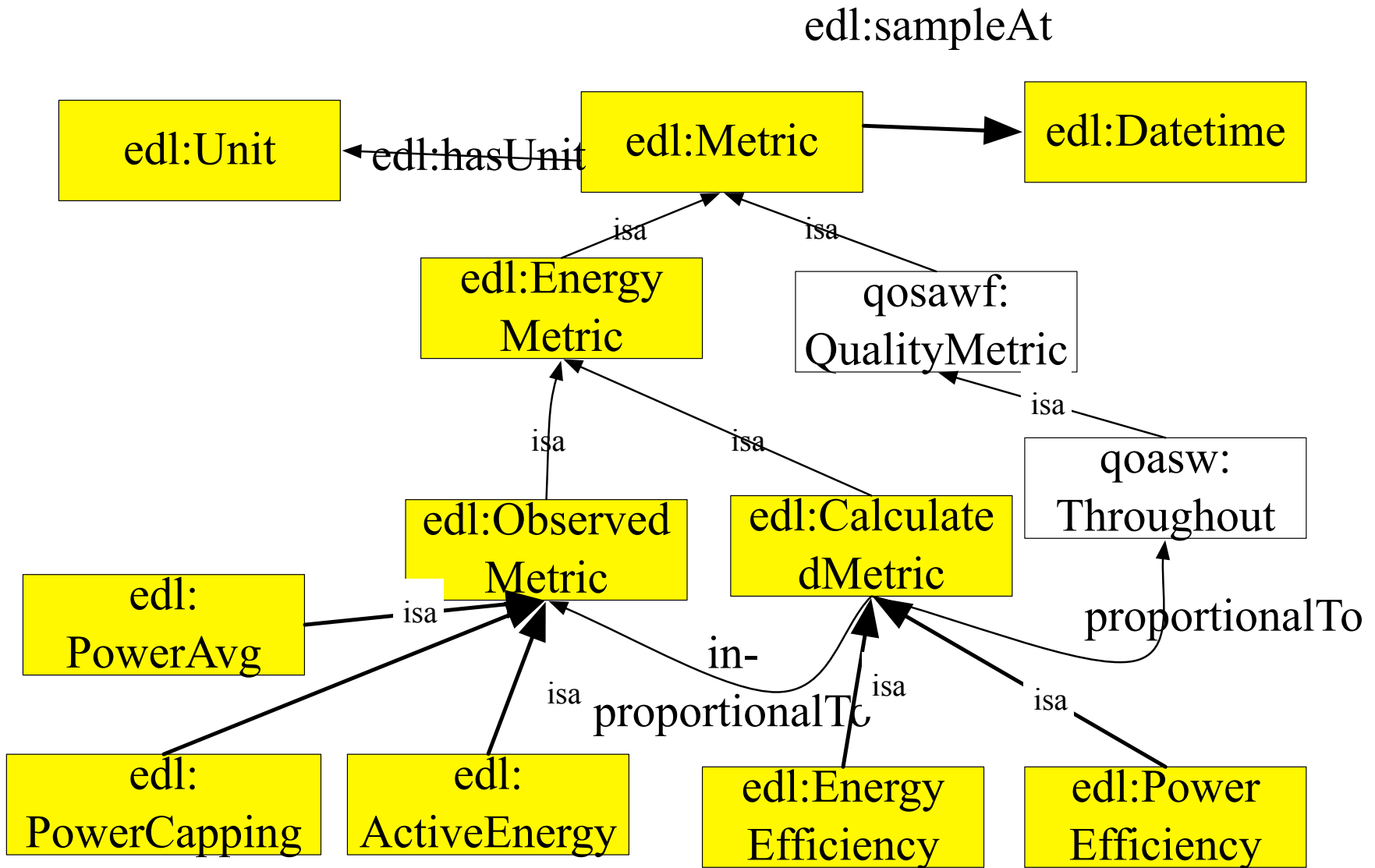


CDL links to NDL using the *owl:SameAs* property. CDL defines the services, NDL the network interfaces and links. The combination of the two ontologies identifies the host pairs that support matching services via existing network connections.

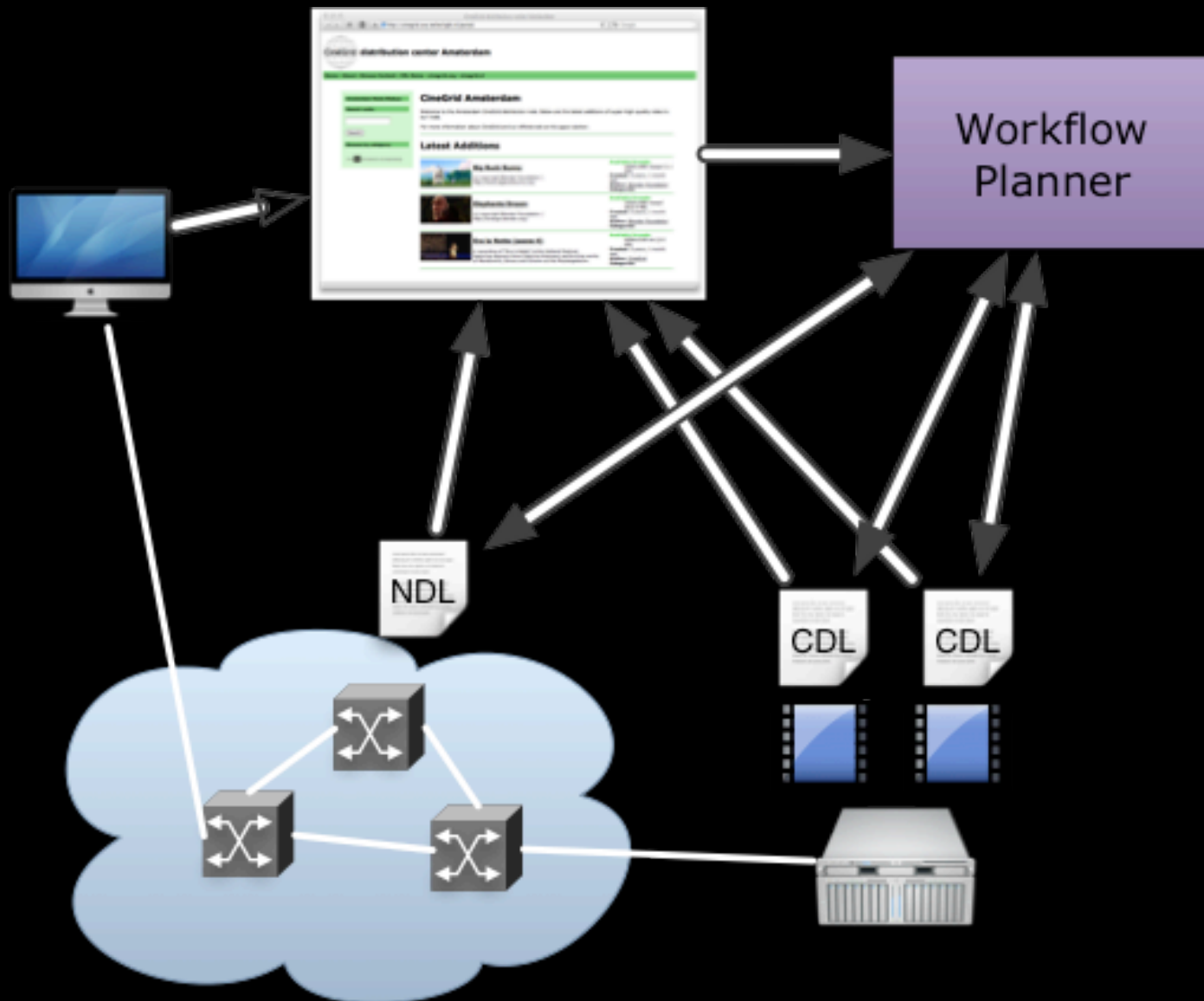


Applications and Networks become aware of each other!

EdL (have already CdL)



CineGrid Workflow Planner





I want to



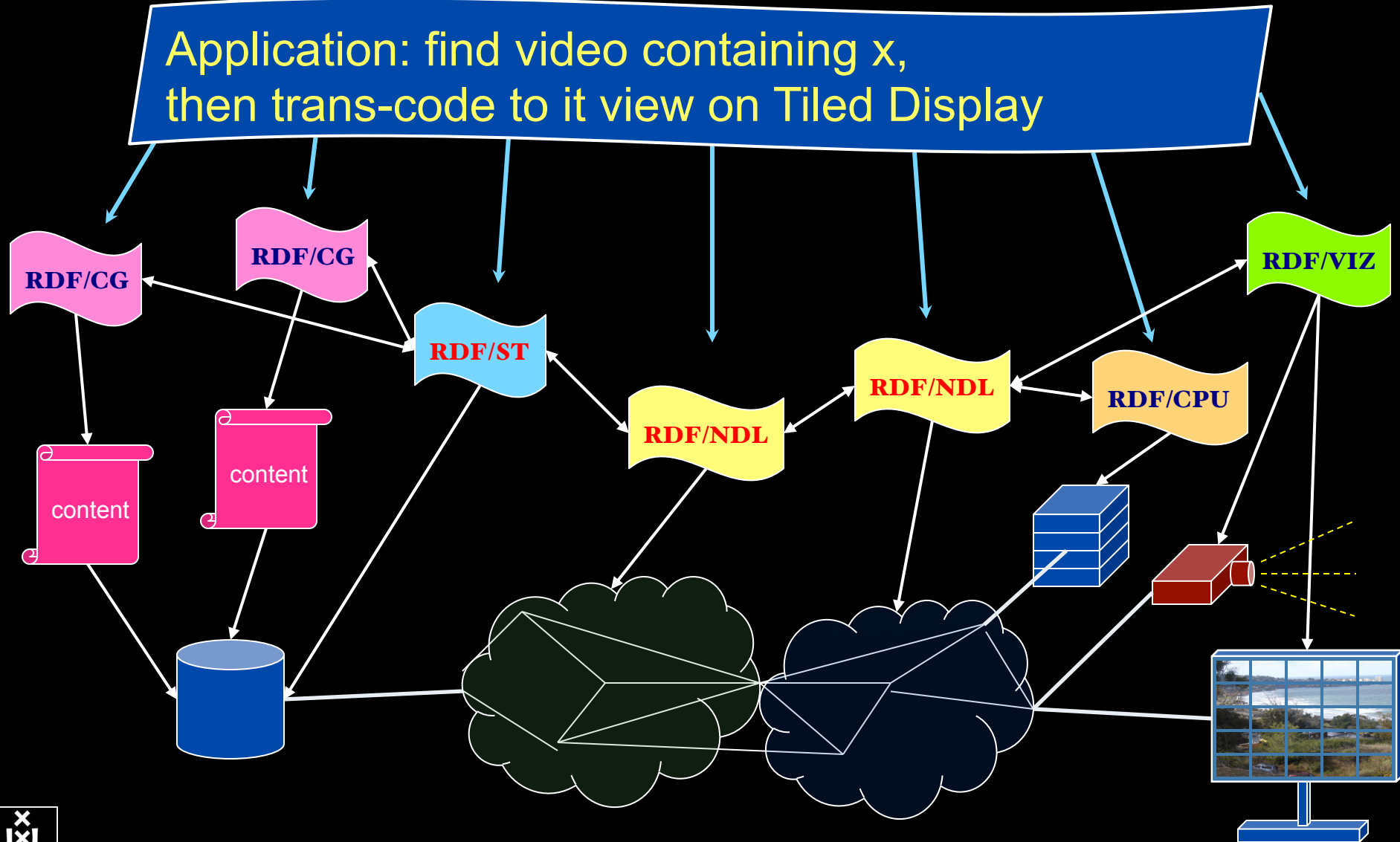
“Show Big Bug Bunny in 4K on my Tiled Display using green Infrastructure”

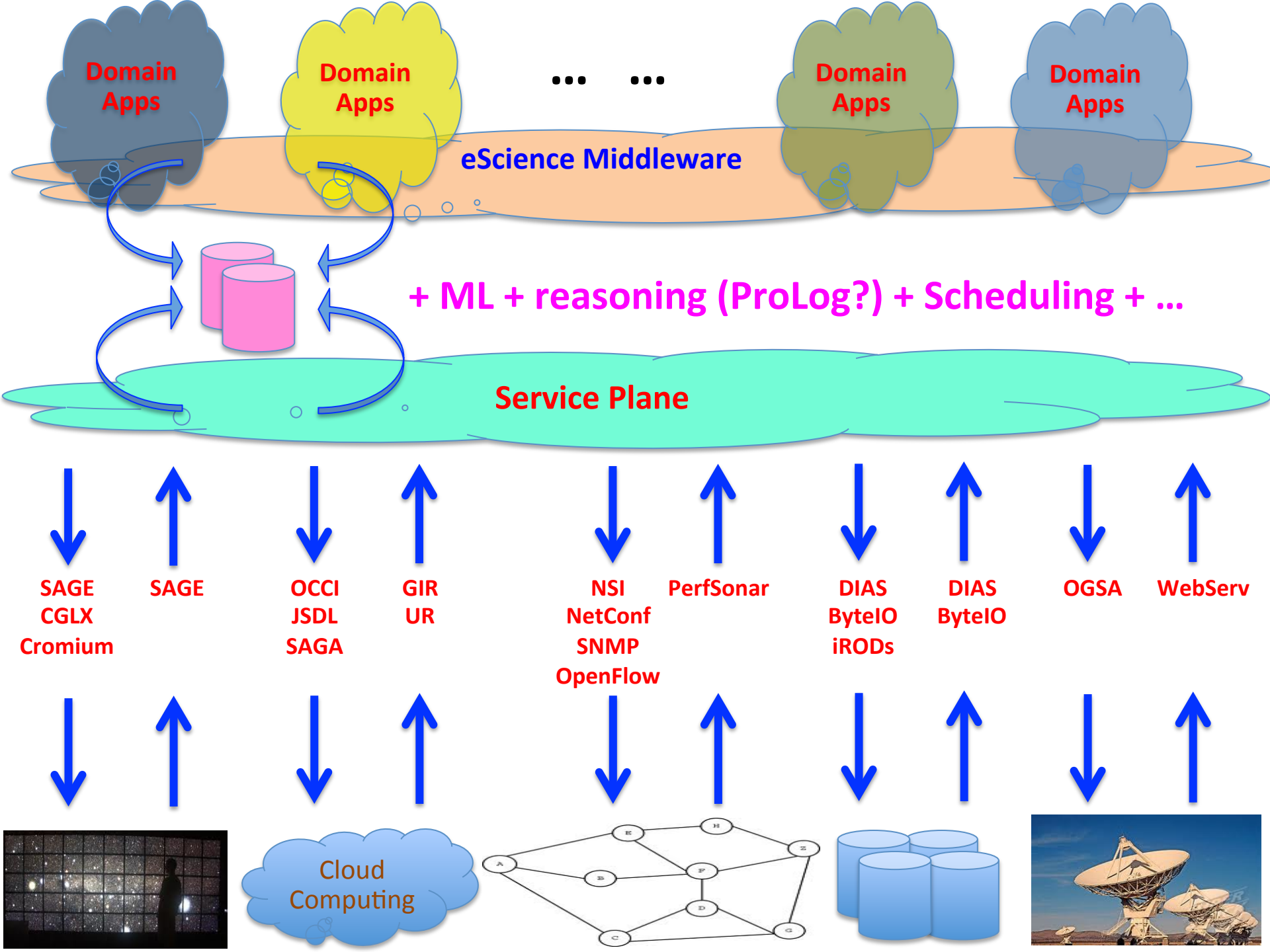
- Big Bugs Bunny can be on multiple servers on the Internet.
- Movie may need processing / recoding to get to 4K for Tiled Display.
- Needs deterministic Green infrastructure for Quality of Experience.
- Consumer / Scientist does not want to know the underlying details.
➔ His refrigerator also just works.

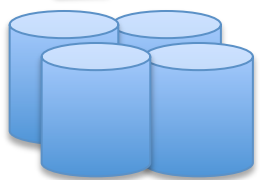
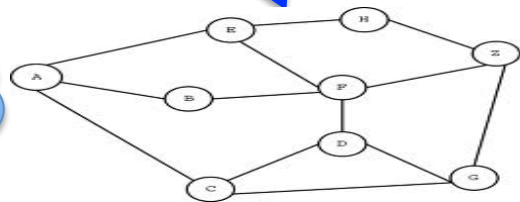
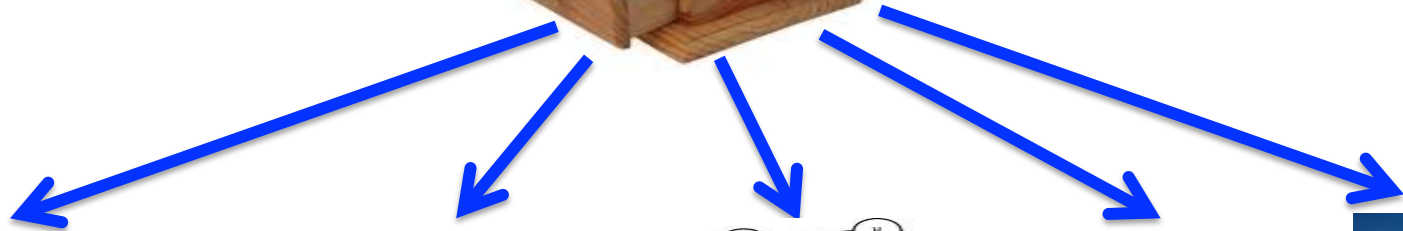
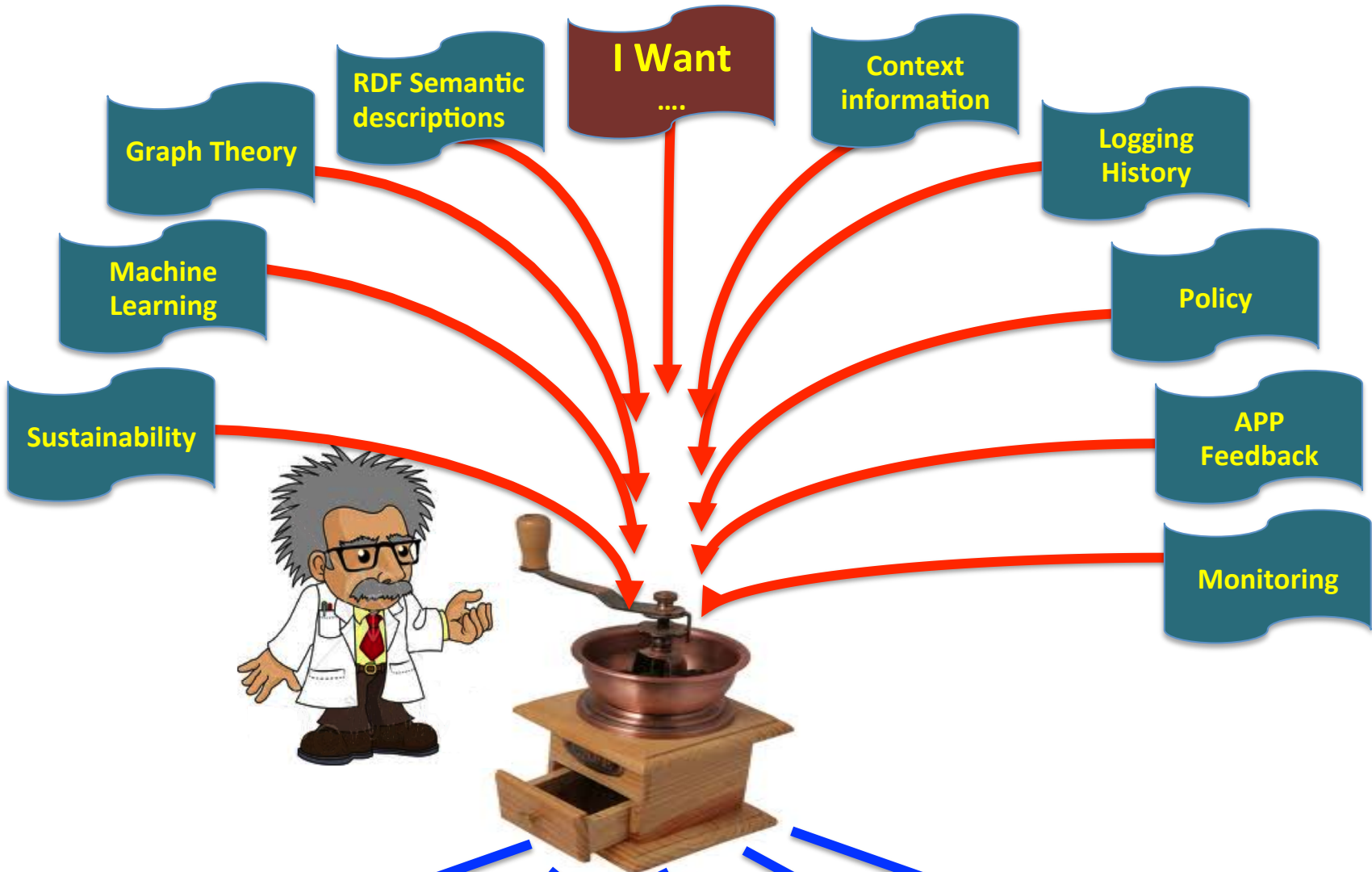
RDF describing Infrastructure

“I want”

Application: find video containing x,
then trans-code to it view on Tiled Display







GreenLight Extended to Networks

- **Need “GreenSonar” software to determine end-to-end costs for transmitting gigabytes and terabytes.**
- **Build on Dutch Resource Description Framework (RDF) for network path finding and perfSONAR for network performance monitoring**
- **Cees de Laat will introduce these concepts**
- **Funding is being actively sought.**



Links

- <http://ext.delaat.net/>
- <http://ext.delaat.net/smartgreen/index.html>
- [http://ext.delaat.net/news/2012-03-23/
index.html](http://ext.delaat.net/news/2012-03-23/index.html)

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