UNIVERSITY OF AMSTERDAM

Dr. Paola Grosso – System and Network Engineering group

Semantics for integrated services

Network QoS in workflows for e-Science

My presentation in a wordle
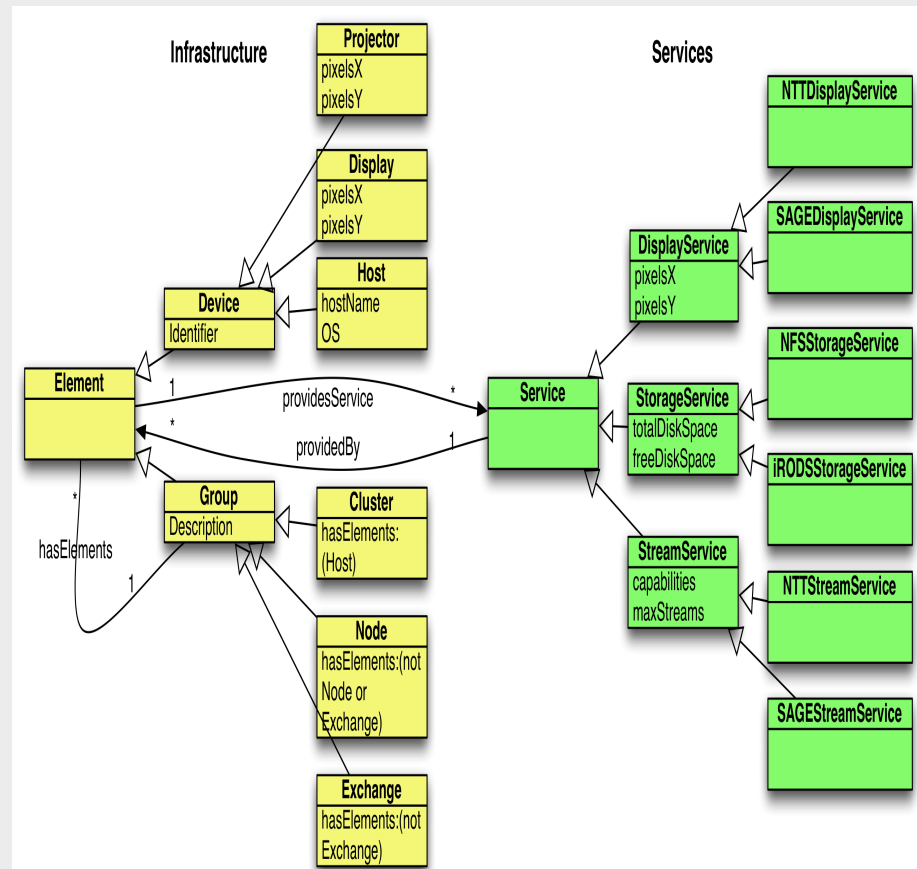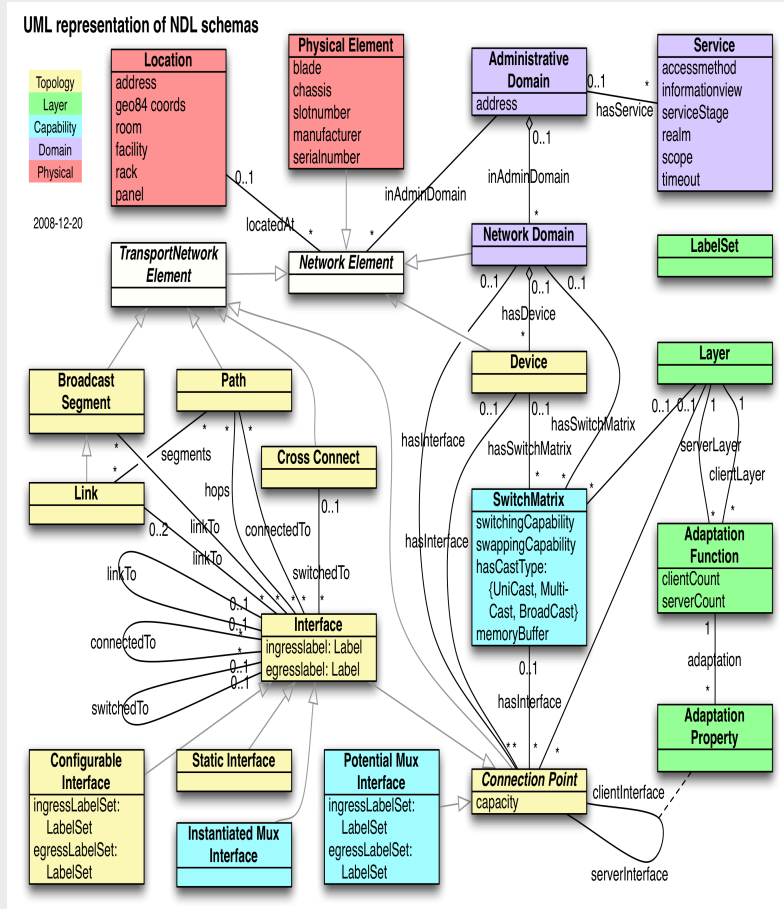
Services and semantics

■ It is our belief that:

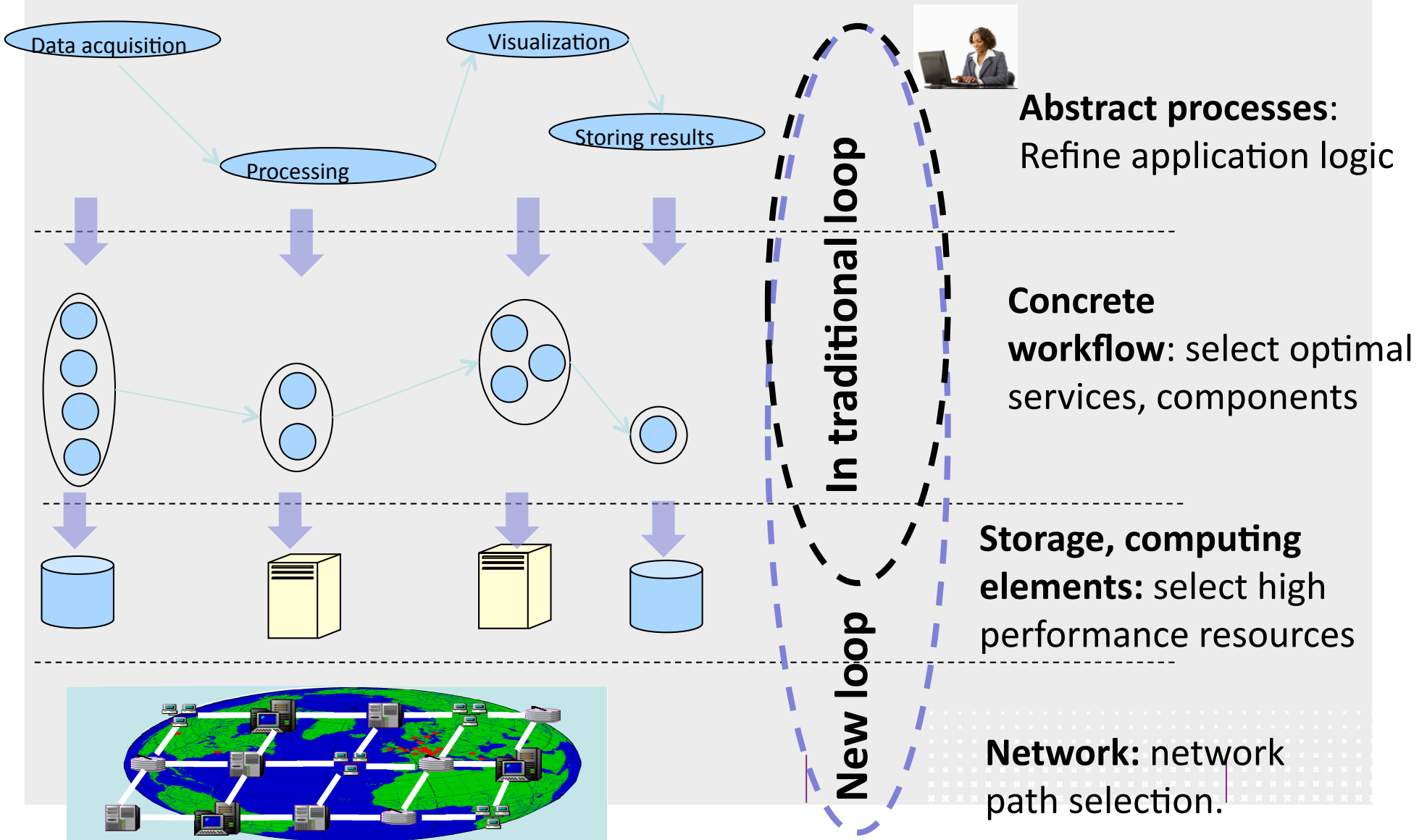***without added semantics (intelligence) you cannot provide integrated services.***
Integrated services require workflows.

■ Our approach:

  □ Semantic Web lead us to **NDL** and **CDL**

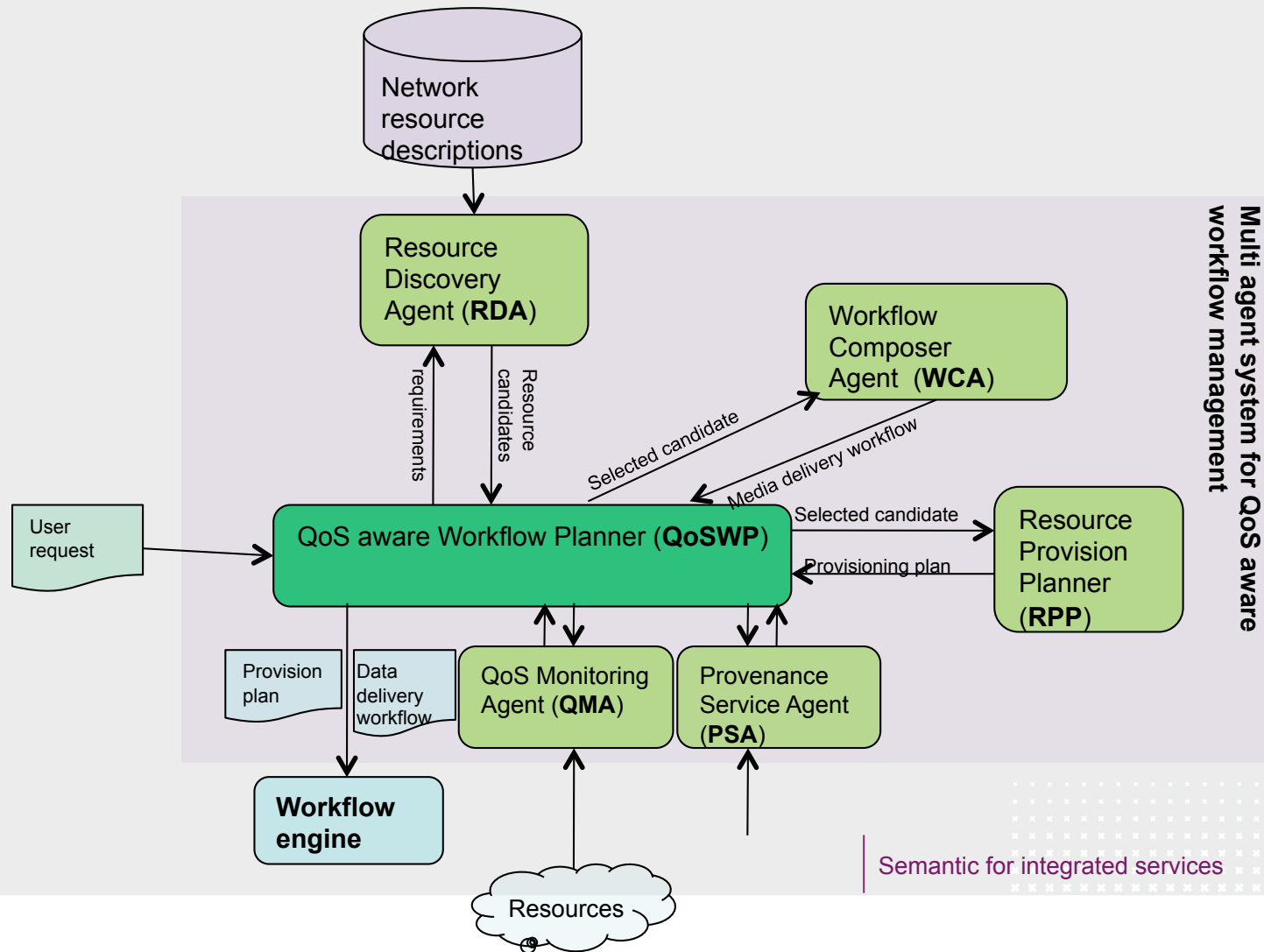 □ Scientific workflows lead us to the **workflow bus platform** developed in the VL-e project.

NDL and CDL

Quality tuning in scientific workflow

Data acquisition

Processing

Visualization

Storing results

In traditional loop

New loop

Abstract processes: Refine application logic

Concrete workflow: select optimal services, components

Storage, computing elements: select high performance resources

Network: network path selection.

Network QoS planner

Network resource descriptions

Resource Discovery Agent (**RDA**)

Workflow Composer Agent (**WCA**)

requirements

Resource candidates

Selected candidate

Media delivery workflow

User request

QoS aware Workflow Planner (**QoSWP**)

Selected candidate

Provisioning plan

Resource Provision Planner (**RPP**)

Provision plan

Data delivery workflow

QoS Monitoring Agent (**QMA**)

Provenance Service Agent (**PSA**)

Workflow engine

Resources

Multi agent system for QoS aware workflow management

QoS abstract workflow process description schema

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QosAWF_Thing

Request

Condition

Data

require_Functionality

Process

Is-a

pre_Condition

execution_Condition

post_Condition

Or_Condition

create_Data

require_Data

contain_Condition

And_Condition

PlaybackData

ArchiveData

MoveData

require_Quality

Media

Scientific_Data

Sensor_Data

Quality_Attribute

Video

Audio

Simulation_Results

Data related process

Pre/Execution/ Post condition

QoS (attributes)

Timeliness

Security_Level

Reliability

Precision

Throughput

Framerate

Resolution

CodecQuality

CompressionRate

Current prototype

- **SWIProlog/Semantic web library**
  - RDF triples manipulations
  - Graph finding algorihm -> network path
  - Solving constraints
- **JAVA Prolog interface (JPL)**
  - Manipulate Prolog functions via Java
- **Java Agent development framework**
  - Agent communication language (ACL) between agents
  - XMLRPC: between agent and web portal

CineGrid use case

- Media delivery on demand
    - □ Search movie
    - □ Propose network path
    - □ Playback the movie
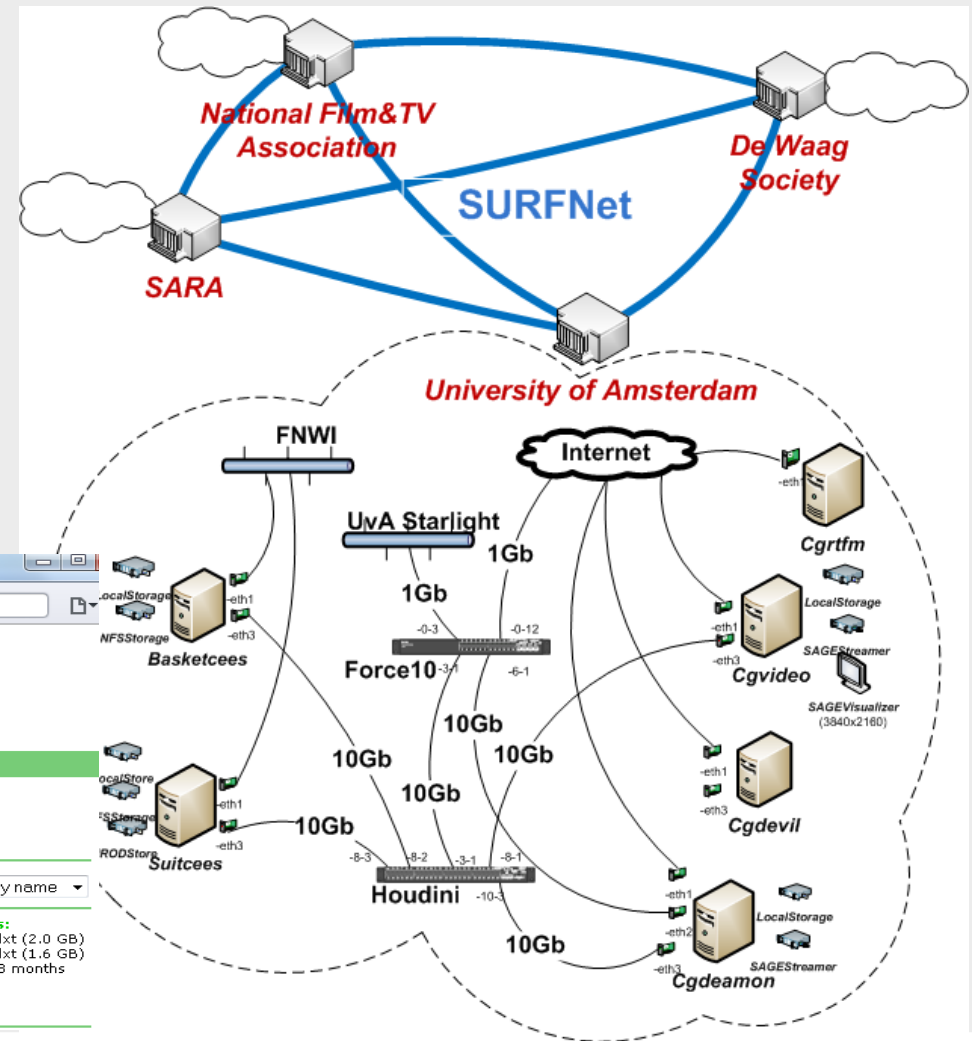
With a big thanks to Zhiming (Zhao)
for lending some of the slides!

More?

We have an upcoming demonstration during SuperComputing.
And we have published a few papers on this:

- Z. Zhao, P. Grosso, R. Koning, J. v/d Ham, C.de Laat
Network resource selection for data transfer processes in scientific workflow
In: Workflows in Support of Large-Scale Science (WORKS10) - November 14 2010, New Orleans, LO

- Z. Zhao, P. Grosso, R. Koning, J. v/d Ham, C. de Laat
An architecture including network QoS in scientific workflows
In: Proceedings of Int'l Conf. on Grid and Cloud Computing (GCC 2010), November 1-5, 2010, Nanjing, China,IEEE Xplore digital library

- Z. Zhao, P. Grosso, R. Koning, J. van der Ham, C. de Laat
An agent based planner for including network QoS in scientific workflows
In: Int'l workshop on Agent Based Computing: from Model to Implementation VII (ABC:MI'10), October 18-20, 2010, in Wisla, Poland, ISSN 1896-7094, IEEE Xplore digital library