Capability and Attribute Based GRID Monitoring Architecture

Jiří Sitera, Luděk Matyska, Aleš Křenek, Miroslav Ruda, Michal Voců, Zdeněk Salvet, Miloš Mulač

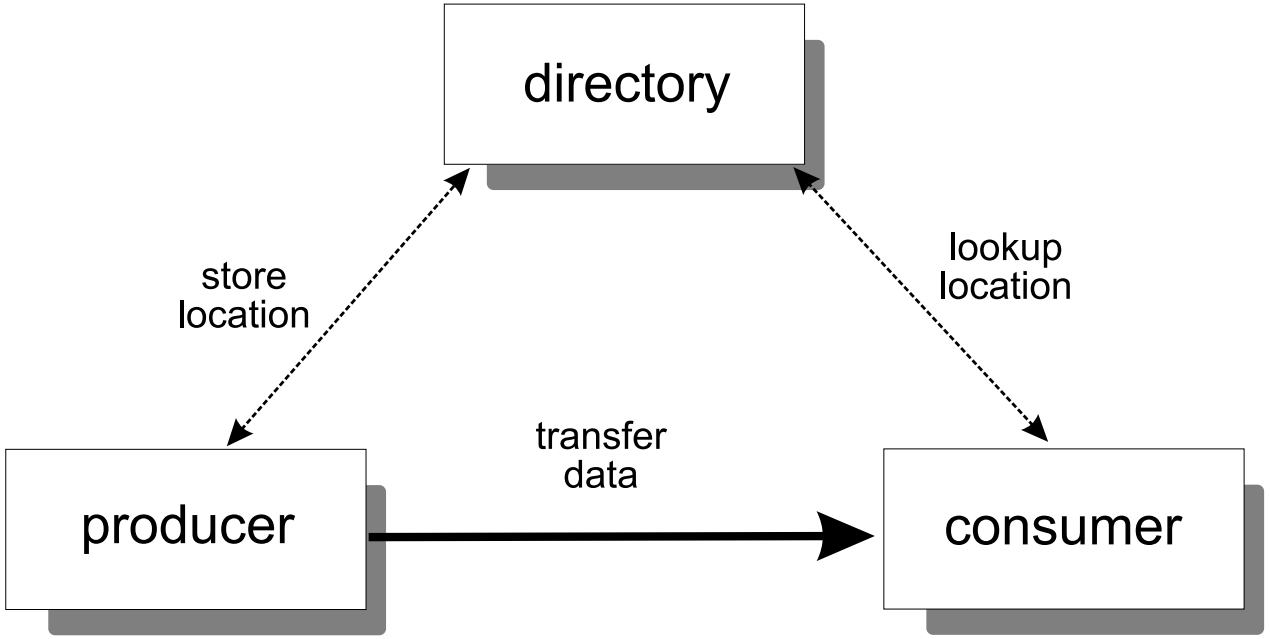
Contact: sitera@civ.zcu.cz, egee-jra1@muni.cz.

CESNET, Prague, Czech Republic

Agenda

- Motivation, why GMA extension
- CGMA proposal
- Prototype based on LB and R-GMA

Grid Monitoring Architecture



- Defines – components, their interaction
- Doesn’t define
  - Interfaces (API)
  - Data description and processing

Interoperability

- Goal of the architecture proposal:
  - *"…to provide a minimal specification that will support required functionality and allow interoperability."*
- GMA is too general to provide interoperability
  - Common concept
  - Not real interoperability tool
- GMA compliance
  - Covers
    - From general purpose…
    - to single-purpose specialized infrastructures

CGMA – capability and attribute based GMA

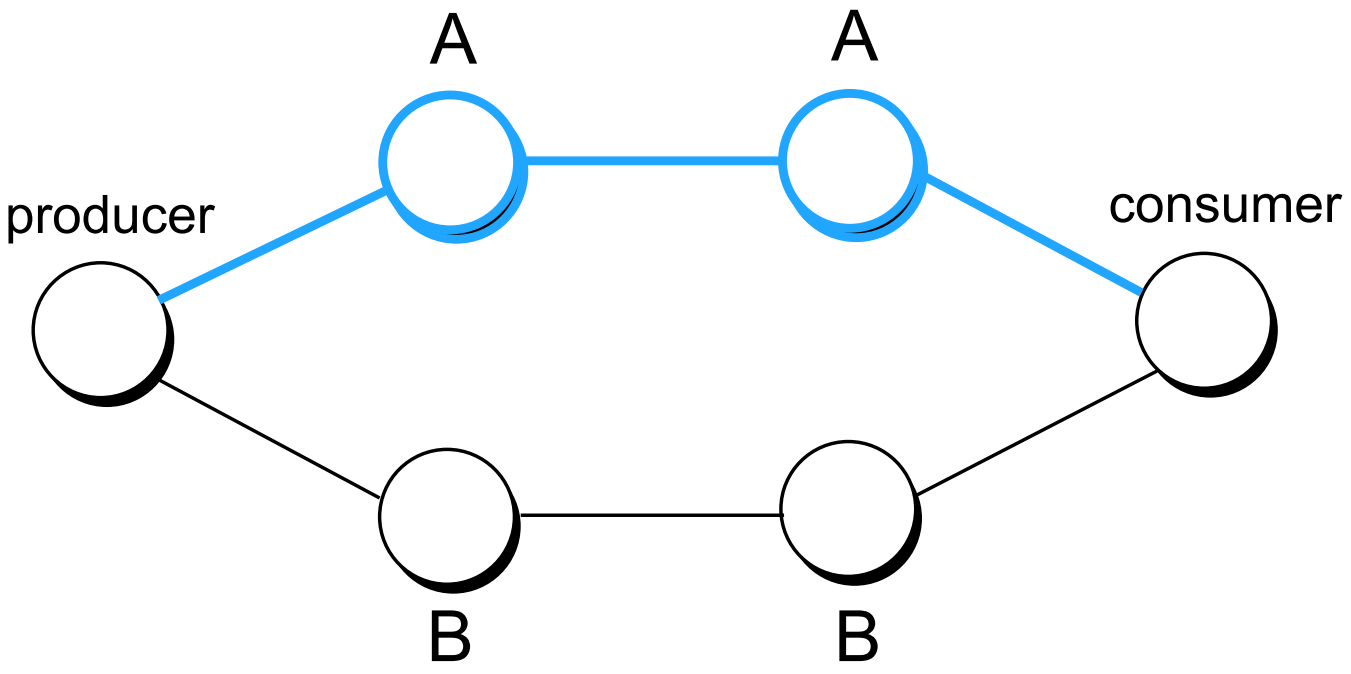
- Integration of different components
  - Independent implementations
  - Specialized and/or optimized components *(high throughput/reliable, security level, data access patterns)*
- No need for general components
  - Different, often contradictory needs
  - Hard to fulfill all at the same time
- CGMA
  - General framework to meet seemingly contradictory requirements

CGMA – key concepts

- Explicit meta-description
  - *Data* have associated its *handling rules* (*"handle with care"*, *"secret"*, *"low priority"*)
    - Permanent
  - *Components* have labels expressing *its ability* to fulfil particular handling rules (*"reliable"*, *"secure level A"*, *"cheap"*)
- Infrastructure on demand
  - Data flow through suitable components
  - Virtual overlay over the whole infrastructure
- Unified approach for coordination of components

Example – choosing proper components

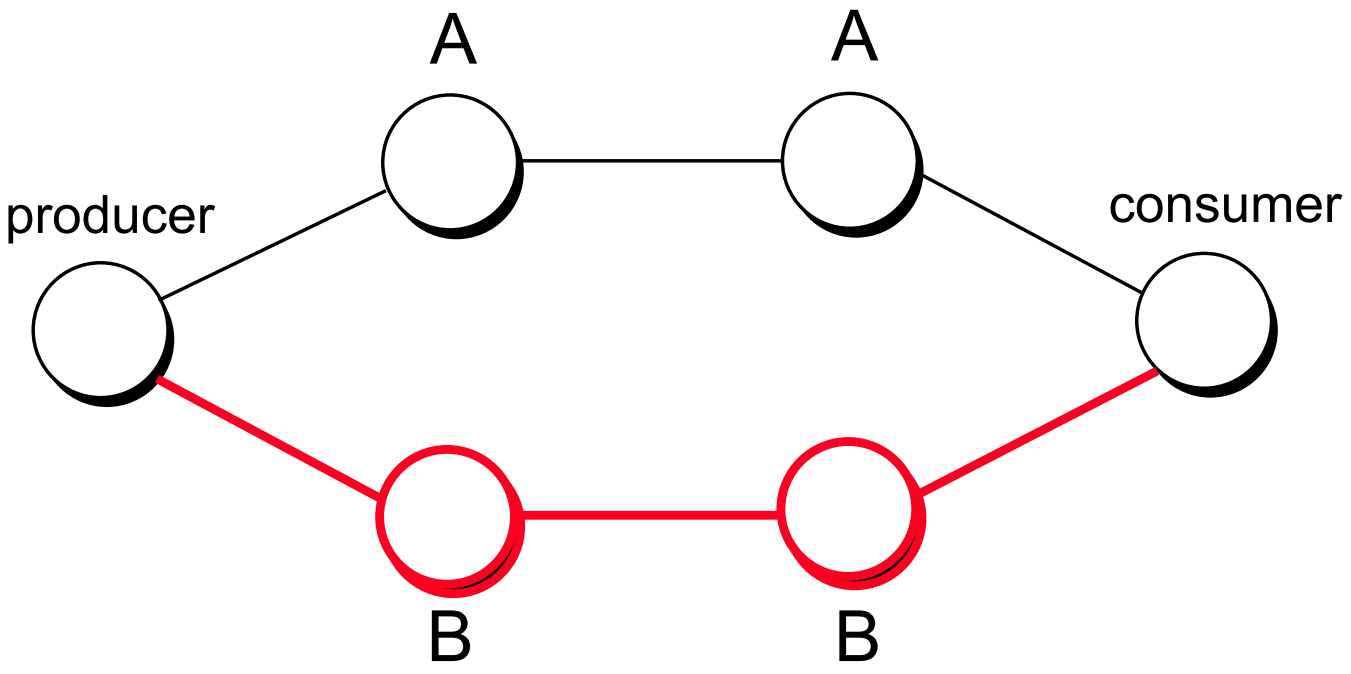
Periodic measurement of network utilization



A - cheap, not persistent (reliable)
B - persistent (reliable)

Example – choosing proper components

Network up/down monitoring events



A - cheap, not persistent (reliable)
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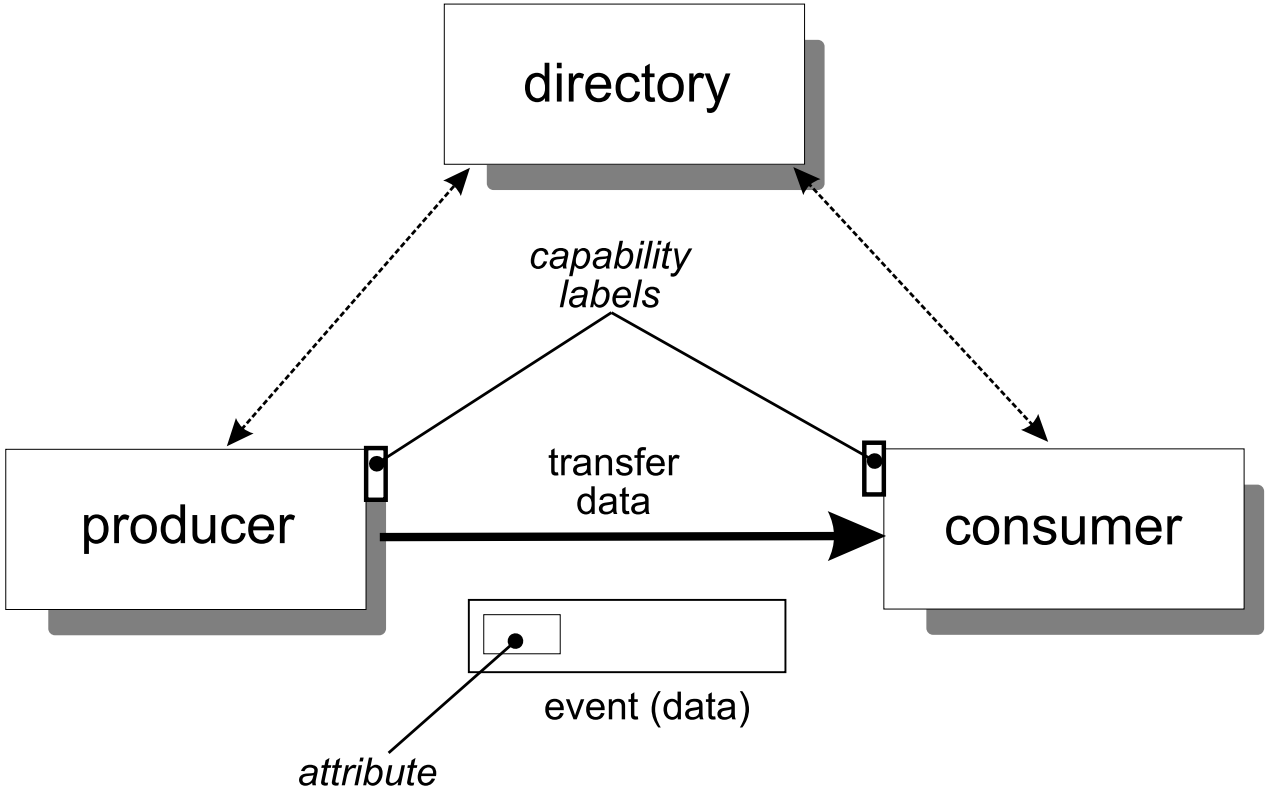
CGMA – attributes and capabilities



- Attributes and capabilities are related
- Match-making: virtually connects components
  - based on particular data attributes
  - and component capabilities

R-GMA

- R-GMA – relational GMA implementation
  - Relational data model for event schema and user queries
  - R-GMA goal: combined monitoring and information model
  - Extended directory – registry, mediator
- Registry/mediator could be extended to provide CGMA match-making
- Relational model – good as query language

Logging and Bookkeeping

- Job state centric service
  - Collects events from GRID components
  - Computes job states
  - Provides query and notification interfaces
- Specialized GMA compliant infrastructure
- LB/(R-)GMA interaction
  - Allow access to bookkeeping data via R-GMA
  - Developed/designed from early stages of LB
  - Problems encountered
    - Security, authorization schema
    - Reliability, guaranteed delivery
  - Summary: not suitable for real usage

Solution using CGMA

- Reengineer LB components
  - Into specialized and optimized CGMA components
- User’s point of view
  - LB events labeled with appropriate attributes
  - Handled by "LB components" (virtual overlay infrastructure)
  - Common interface (R-GMA) – data description, queries

CGMA prototype

- Based on R-GMA and LB
  - From R-GMA
    - Relational model
    - Extended interfaces
  - From LB
    - Infrastructure components
    - Security implementation and model
  - Basic match-making funcionality
- Open environment for other developments
- Work in progress
  - In collaboration with UK R-GMA team (S. Fisher)

Summary

- CGMA – new generation Grid Monitoring Architecture
- Meta-description of data properties
- Different components (with meta-description)
  - Specialized/optimized
  - Independent implementations
  - Common user interface
- Data and components must fit together
  - Virtual overlay network (data driven establishment)
- R-GMA and LB based prototype under development

References and contacts

- References
  - GMA specification
    `http://www-didc.lbl.gov/GGF-PERF/GMA-WG/`
  - LB (Logging and Bookkeeping) – CHEP04 poster
  - R-GMA basics – `http://www.r-gma.org/`
- More information
  - CGW04 paper
  - CESNET team contact:
    `sitera@civ.zcu.cz, egee-jra1@muni.cz`

THANK YOU