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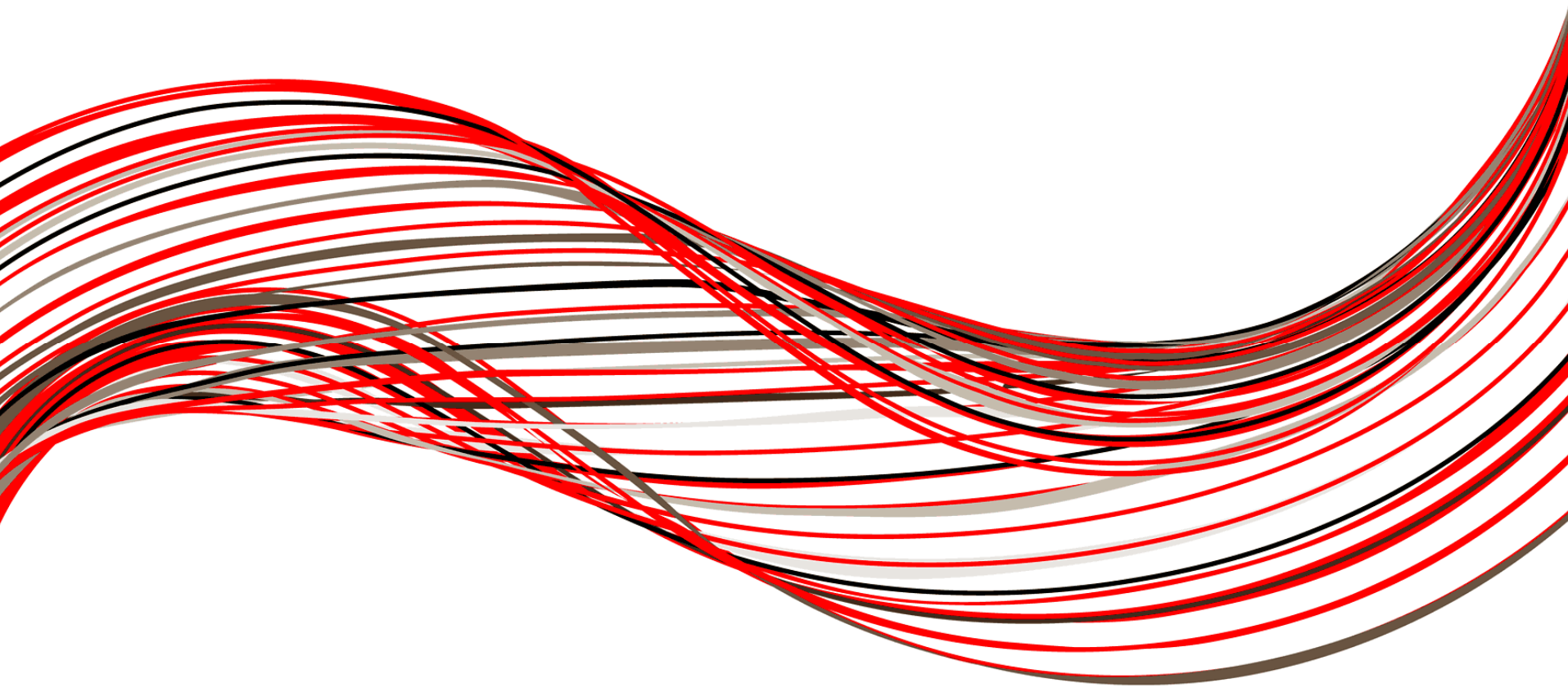
THE POSSIBILITIES ARE INFINITE



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Direction and Trends in Grid Computing Standards

Dr. David Snelling
Distributed Services Research Group
Fujitsu Laboratories of Europe

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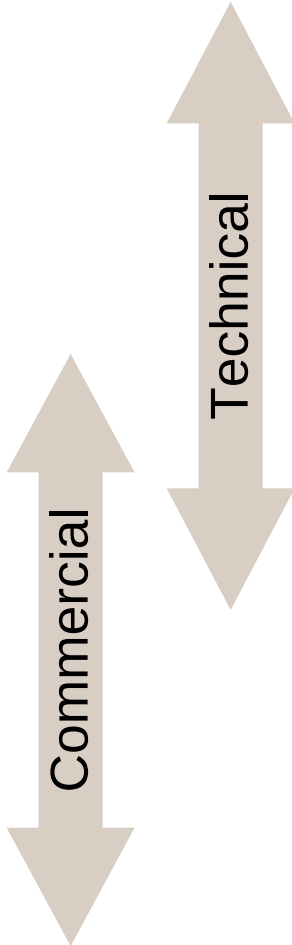
Outline

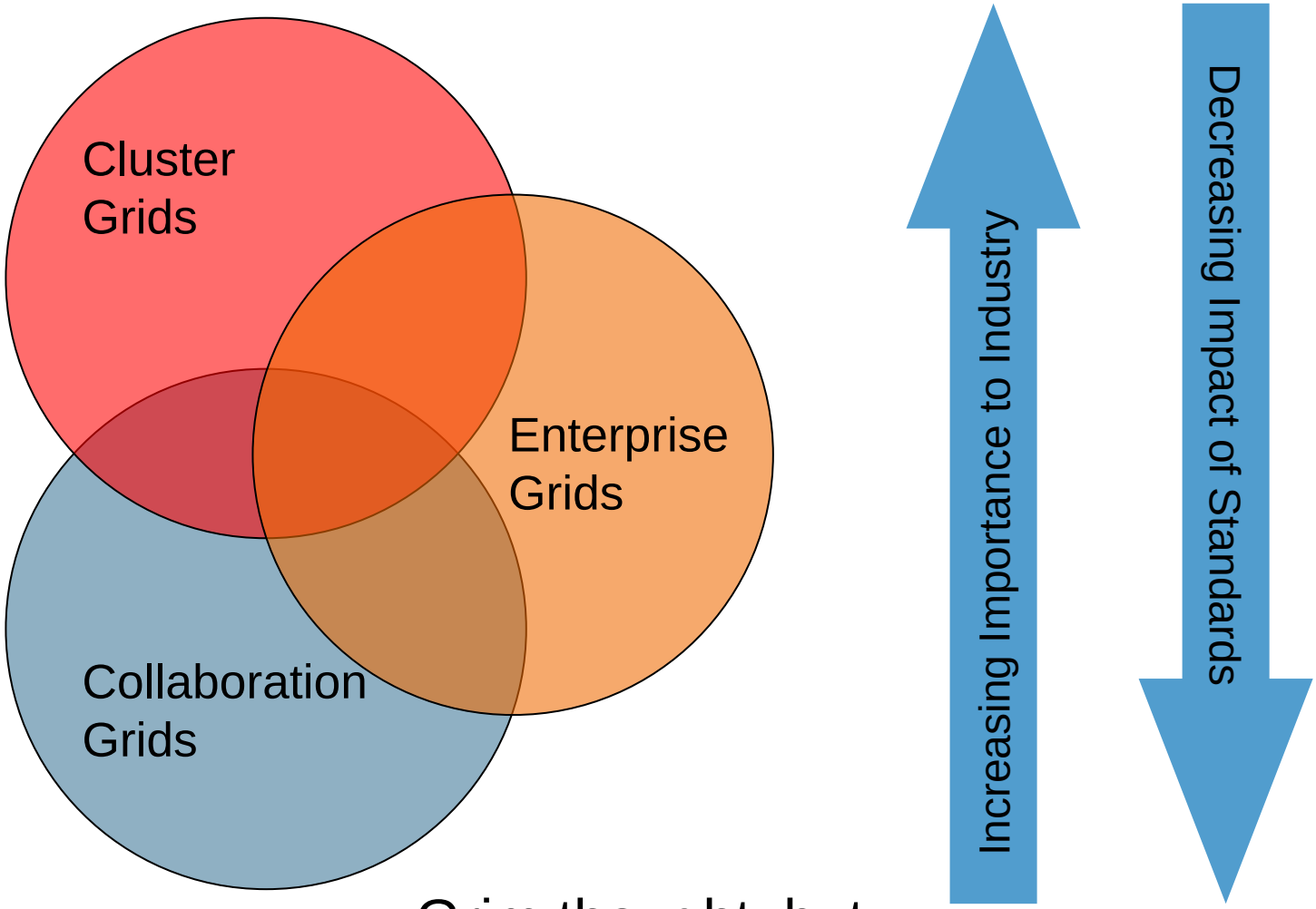
- Grid Computing Landscape
- Standards Impact on that Landscape
- Standards Trends
- “Top Ten” Grid Standards
- Managing Convergence of Standards
- Unicore and Standards
- Next Steps?

The Grid Computing Landscape

- Orchestrator: Collaboration Grids
  - Multiple institutions, secure, widely distributed, VOs
  - Service level agreements & commercial partnerships
  - Overall Aim: New modes of business and research
- Service Provider: Enterprise Grids
  - Virtualization of enterprise resources and applications
  - Aggregation and centralization of management
  - Overall Aim: Reduce total cost of ownership
- Systems Manager: Clusters
  - Networks of Workstations, Blades, etc.
  - Cycle scavenging, Homogeneous workload
  - Overall Aim: More efficient use of assets

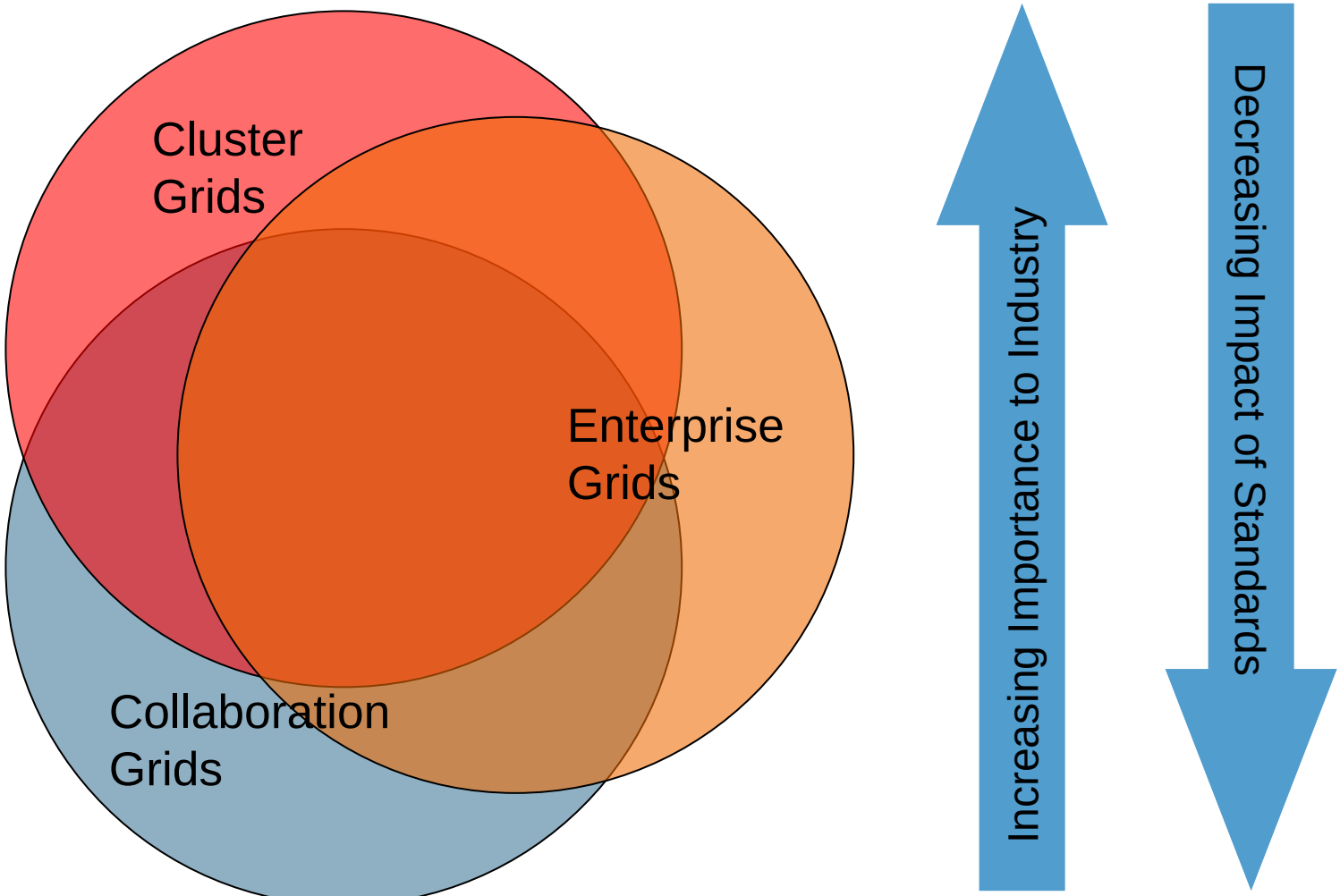


Standards Impact on Grid Computing



Grim thought, but …

… The Trend is Better



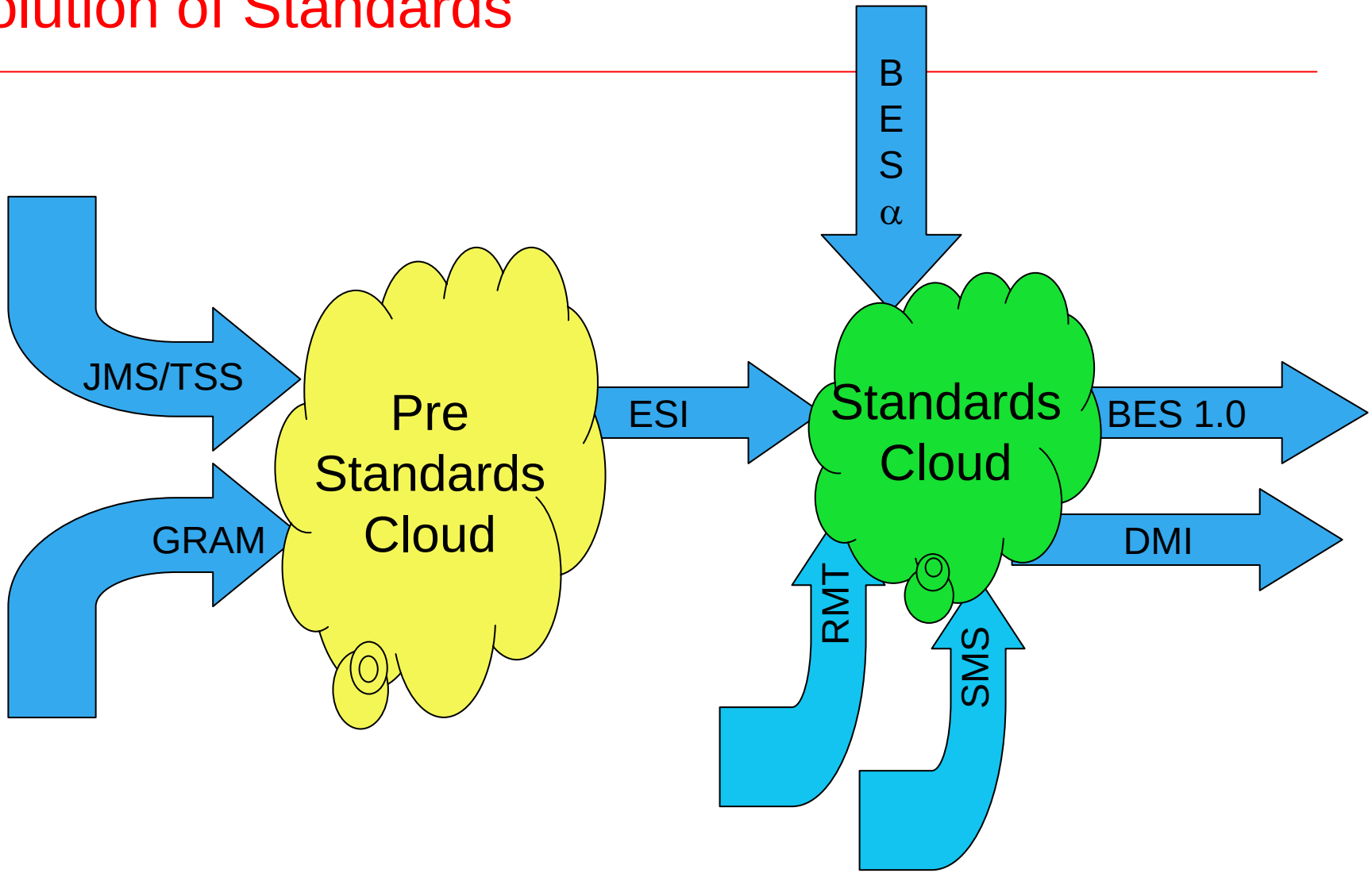
High Impact “Grid-Like” Standards

- WS-Addressing
  - Meets addressing requirements missed in basic WSs
  - Uses structured identifiers and protocol rules
  - Is (at least theoretically) binding independent.
- OGSI, WSRF, WS-Transfer, WS-Resource Transfer
  - Acknowledges patterns in management and discovery
  - Broad applicability
  - Clearly includes various approaches
- WS-Notification, WS-Eventing, WS-Event Notification
  - Highlights a fundamental pattern in distributed systems
  - Critical space for standards

Grid Computing's Top Ten Standards

- Stable
  - JSDL
  - OGSA-BES
  - GridFTP
  - OGSA Security Profile Core
  - OGSA Security Profile Secure Channel
- Evolving with a Clear Direction
  - OGSA Base Profile (Next Revision)
    - WS-Addressing, WS-Resource Transfer, WS-Event Notification
  - OGSA-AuthZ-SAML
    - Including WS-Security
- Under Development
  - DMI
  - OGSA-RSS
  - OGSA Information Model

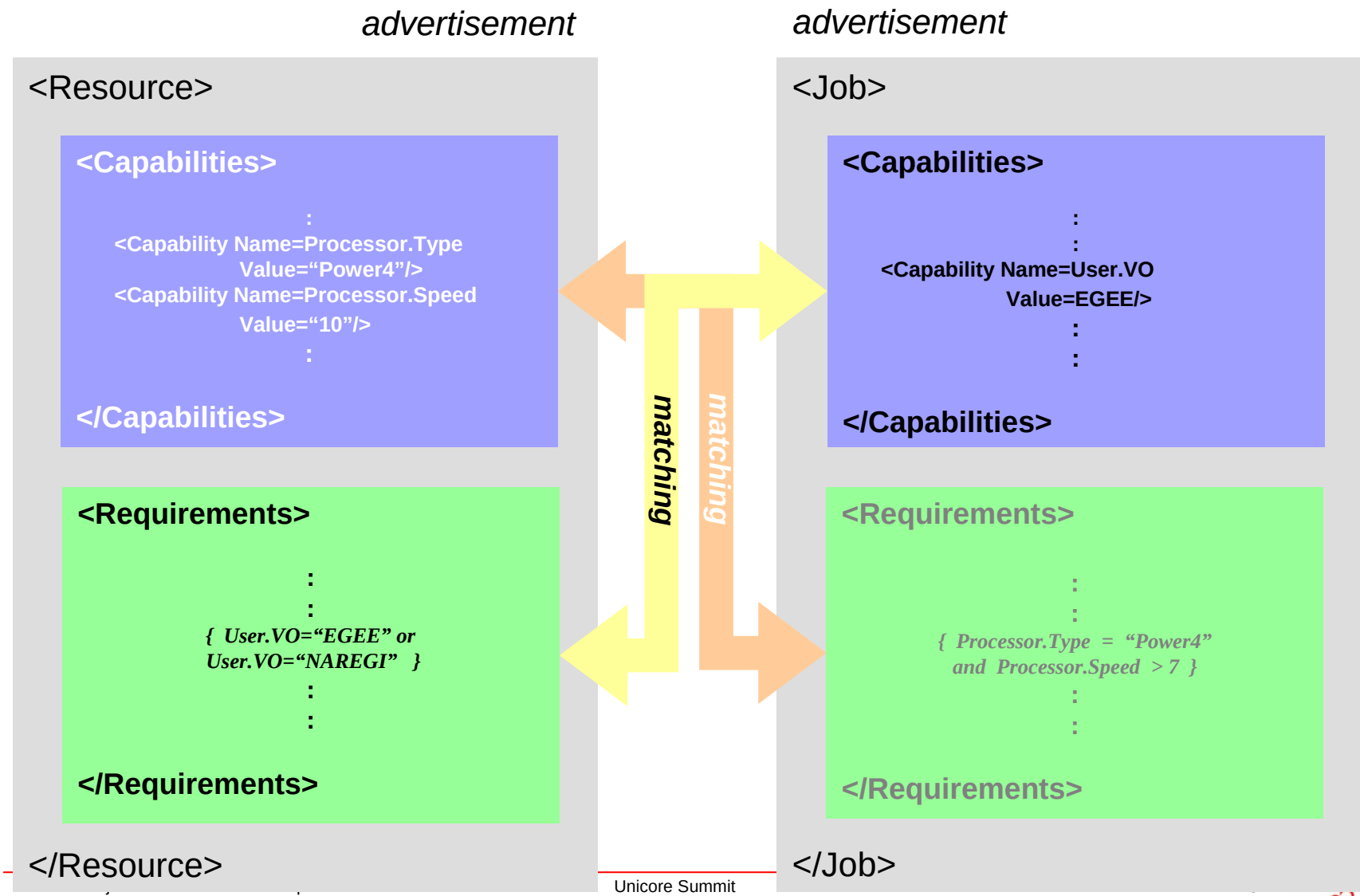
Evolution of Standards



Convergence Toward WS-Resource Transfer

- All Specifications Cover the same Use Cases
  - Stateful Services/Resources
  - Access to properties of these
  - Support for lifetime management
  - Mechanisms for subscription
- Observation
  - Most functional operation of a service is orthogonal to these “management” related capabilities
- Strategies
  - Use stable API for both client and service
  - Model service state with properties
    - Don’t use state modifying operations, e.g. SetResourceProprties
  - Include an abstract notion of lifetime in all services
  - Expect that notifications of property changes will be possible

A Peek at the OGSA Information Model



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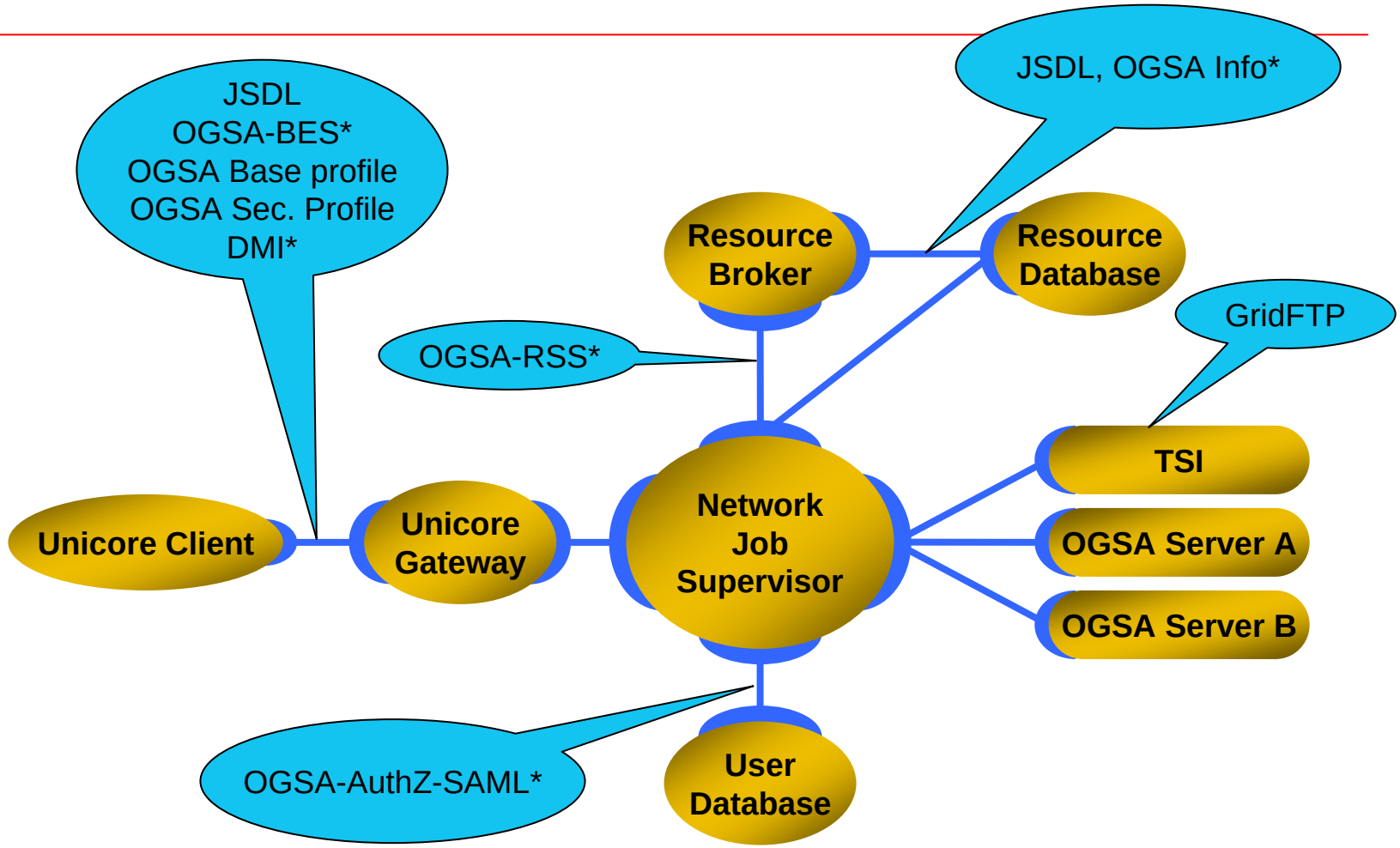
Unicore and Standards



* Future plans or in process

What Next for Unicore and Standards?

- Unicore has lost a lot in the recent quest for standards
  - Workflow
  - Integrated file transfer protocol
  - Incarnation and seamless computing
  - Client integration
  - Extensibility
  - Integrated job/task management
  - Seamless file access
  - Portfolio support
- Starting points
  - Grid Beans integration with SAGA standard?
  - REST based Grids?
  - Service side developer APIs?
  - ????

What is the impact of water on a lava field?