Grid anatomy & Open grid services architecture (OGSA)

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Outline

- Why grid?
- Virtual Organizations (Vos)
- Grid Architecture
- Service oriented Architecture
- Web Service Definition language (WSDL)
- Open Grid Service Architecture
- Interfaces
- Hosting Environment
- Case study

Why grid?

- Why not world wide web?
- Why not Application and Storage Service Providers like VPNs?
- Why not peer-to-peer Computing?
- So, We need
  - Coordinated resource sharing and problem solving in dynamic, multi-institutional virtual organization.

Virtual Organizations (Vos)

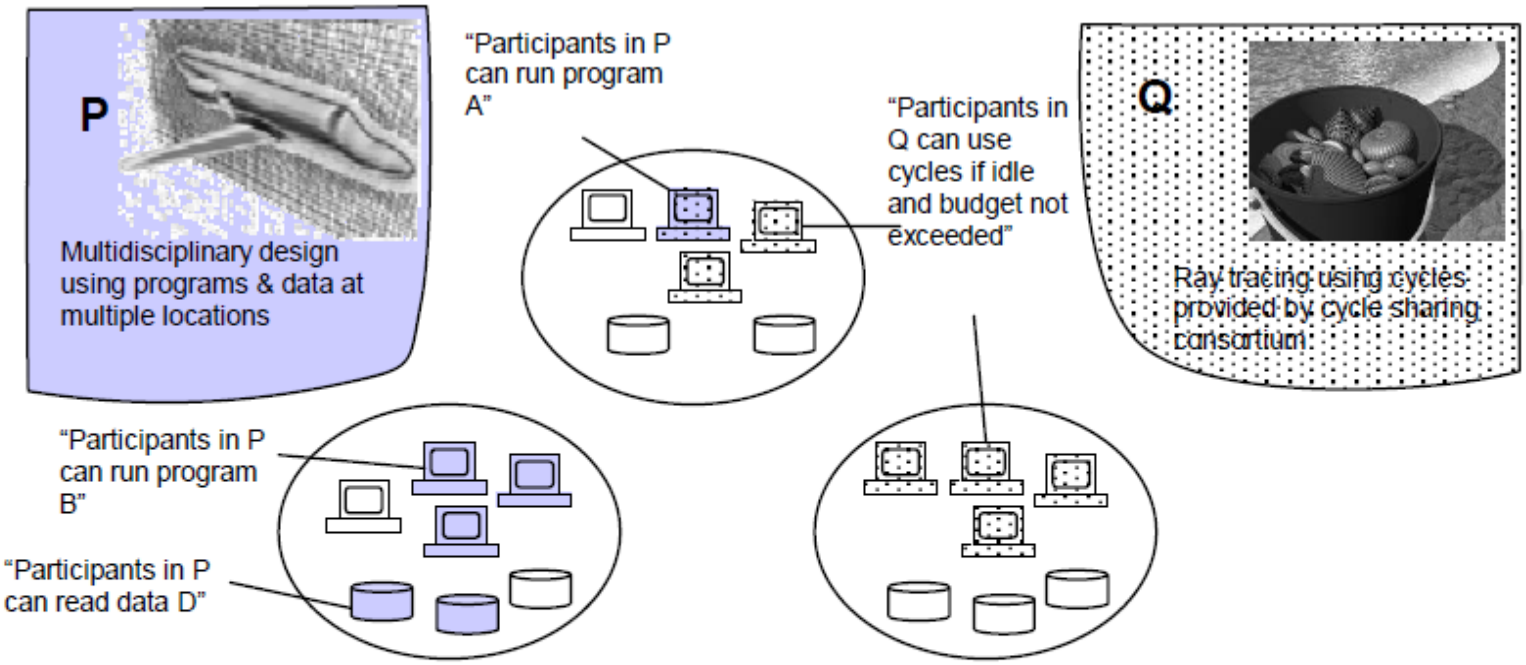


Figure 1: An actual organization can participate in one or more VOs by sharing some or all of its resources. We show three actual organizations (the ovals), and two VOs: P, which links participants in an aerospace design consortium, and Q, which links colleagues who have agreed to share spare computing cycles, for example to run ray tracing computations. The organization on the left participates in P, the one to the right participates in Q, and the third is a member of both P and Q. The policies governing access to resources (summarized in "quotes") vary according to the actual organizations, resources, and VOs involved.

GRID ARCHITECTURE

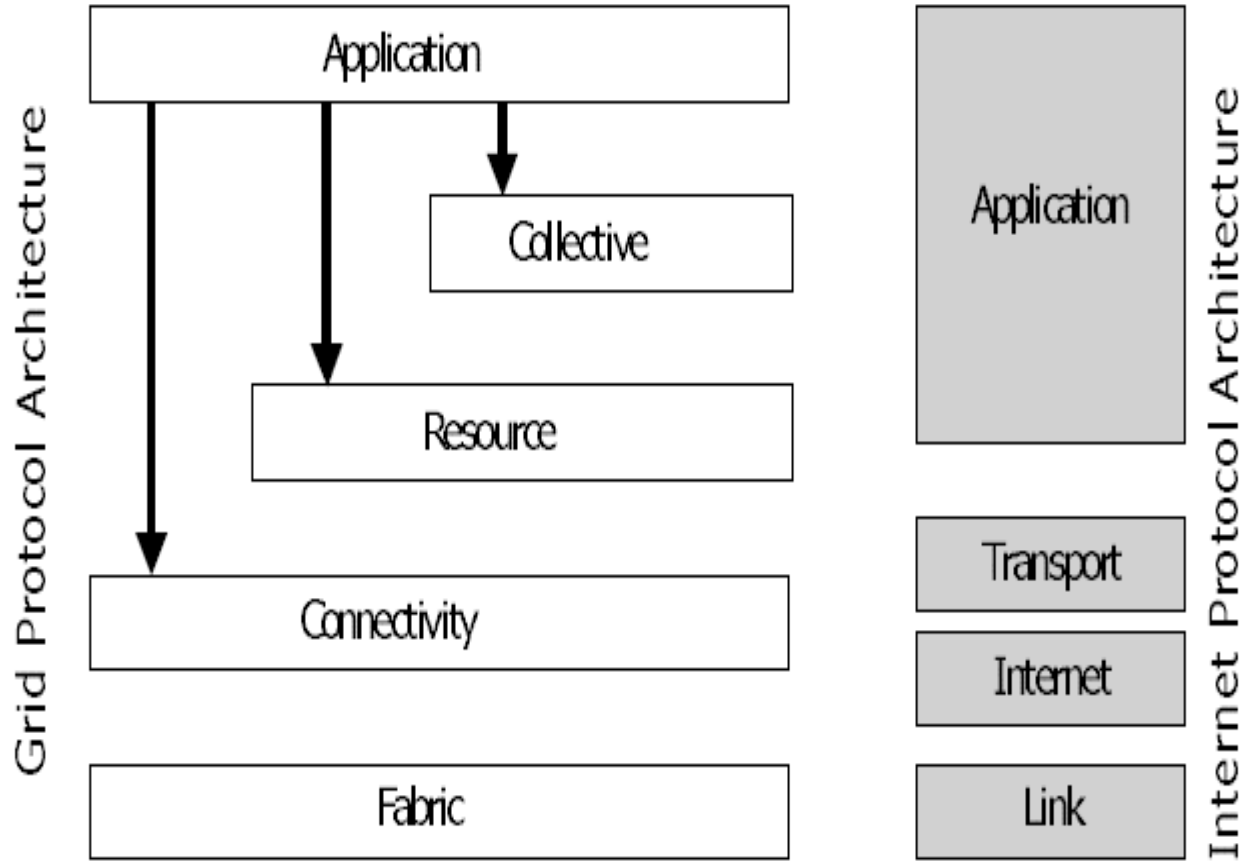


Figure 2: The layered Grid architecture and its relationship to the Internet protocol architecture. Because the Internet protocol architecture extends from network to application, there is a mapping from Grid layers into Internet layers.

SERVICE ORIENTED ARCHITECTURE (SOA)

- What is a Service?
  - Interface
  - Behaviors
  - Service Discovery
  - Service Composition
  - Service Data Element

“We need SOA for distributed computing.”

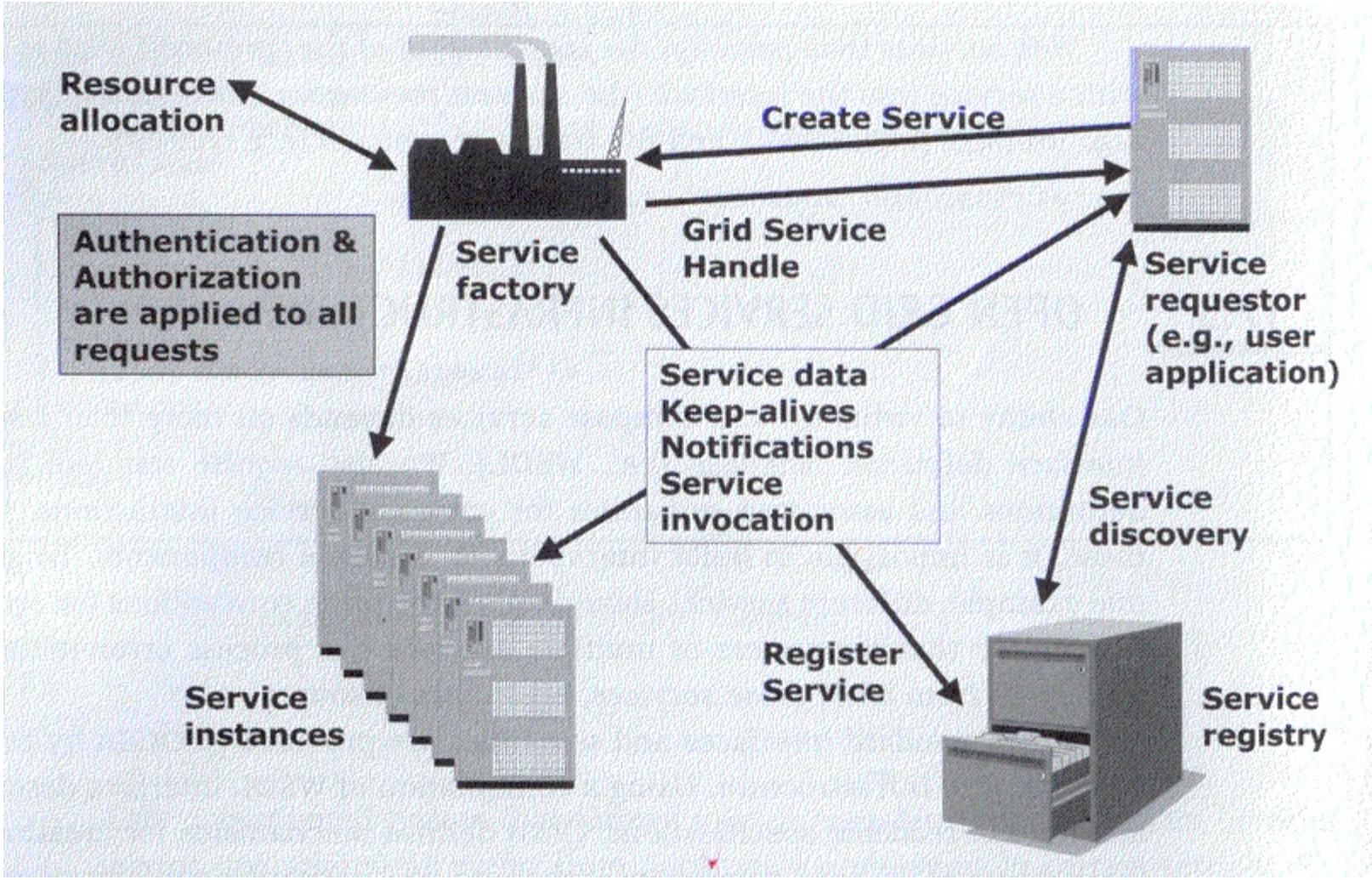
Web service definition language (wsd


```
<wsdl:definitions xmlns:tns="..."
targetNamespace="...">
    <message name="getFileRequest">
        <part name="term" type="xs:string"/>
    </message>
    <message name="getFileResponse">
        <part name="value" type="xs:string"/>
    </message>
    <portType name="StorageServicechange">
        <operation name="getFile">
            <input message="getFileRequest"/>
            <output message="getFileResponse"/>
```

Web service definition language (wsd


```
<binding type="glossaryTerms" name="b1">
    <soap:binding style="document"
transport=http://schemas.xmlsoap.org/soap/http />
    <operation>
        <soap:operation
soapAction="http://example.com/getFile" />
        <input>
        <soap:body use="literal"/>
        </input>
        <output>
        <soap:body use="literal"/>
        </output>
```

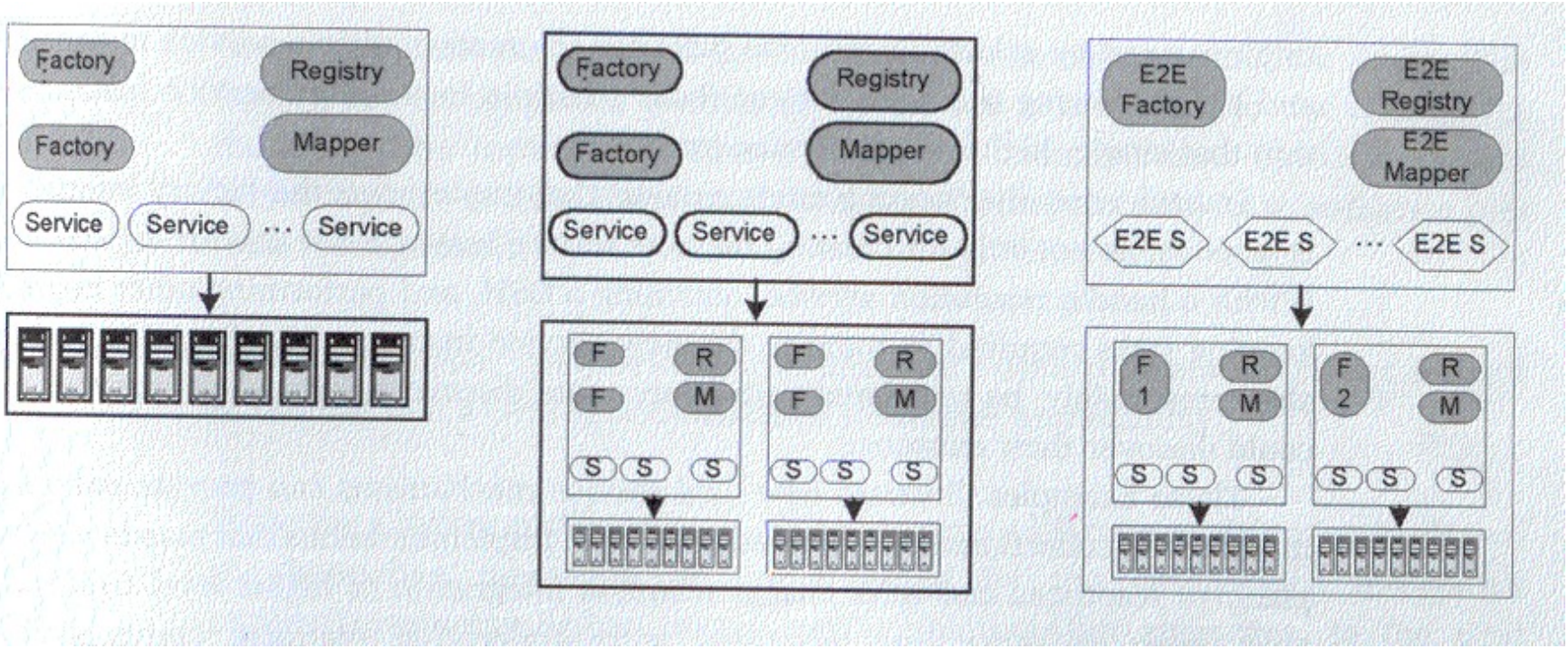
Open grid service architecture



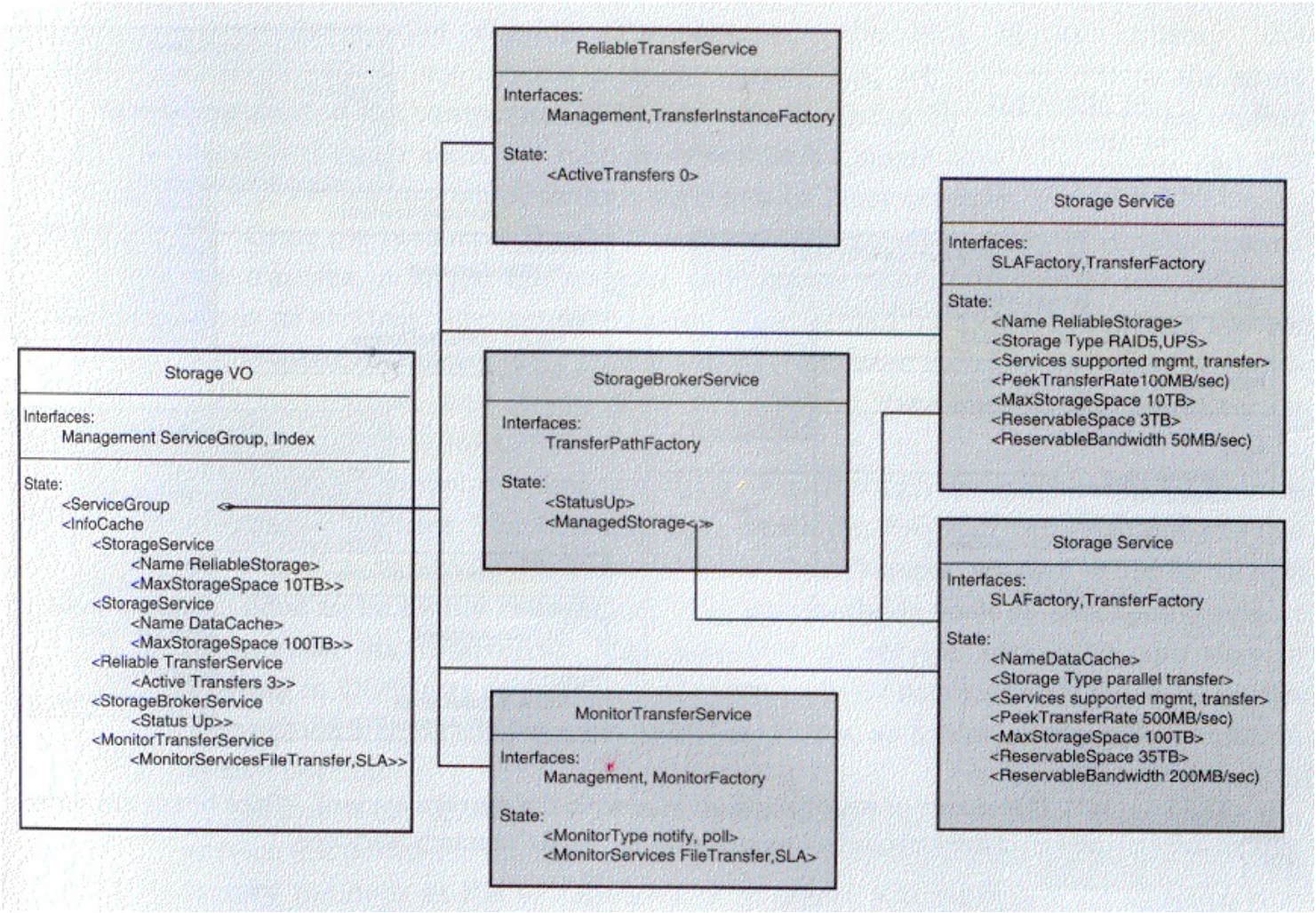
Interfaces

- GridService
- HandleResolver
- NotificationSource
- NotificationSubscription
- NotificationSink
- Factory
- ServiceGroup
- ServiceGroupRegistration
- ServiceGroupEntry

Hosting environment



Case study


ReliableTransferService
Interfaces:
Management,TransferInstanceFactory
State:
<ActiveTransfers 0>
Storage Service
Interfaces:
SLAFactory,TransferFactory
State:
<Name ReliableStorage>
<Storage Type RAID5,UPS>
<Services supported mgmt, transfer>
<PeekTransferRate100MB/sec)
<MaxStorageSpace 10TB>
<ReservableSpace 3TB>
<ReservableBandwidth 50MB/sec)
Storage VO
Interfaces:
Management ServiceGroup, Index
State:
<ServiceGroup
<InfoCache
<StorageService
<Name ReliableStorage>
<MaxStorageSpace 10TB>>
<StorageService
<Name DataCache>
<MaxStorageSpace 100TB>>
<Reliable TransferService
<Active Transfers 3>>
<StorageBrokerService
<Status Up>>
<MonitorTransferService
<MonitorServicesFileTransfer,SLA>>
StorageBrokerService
Interfaces:
TransferPathFactory
State:
<StatusUp>
<ManagedStorage<>>
Storage Service
Interfaces:
SLAFactory,TransferFactory
State:
<NameDataCache>
<Storage Type parallel transfer>
<Services supported mgmt, transfer>
<PeekTransferRate 500MB/sec)
<MaxStorageSpace 100TB>
<ReservableSpace 35TB>
<ReservableBandwidth 200MB/sec)
MonitorTransferService
Interfaces:
Management, MonitorFactory
State:
<MonitorType notify, poll>
<MonitorServices FileTransfer,SLA>

Thank You