

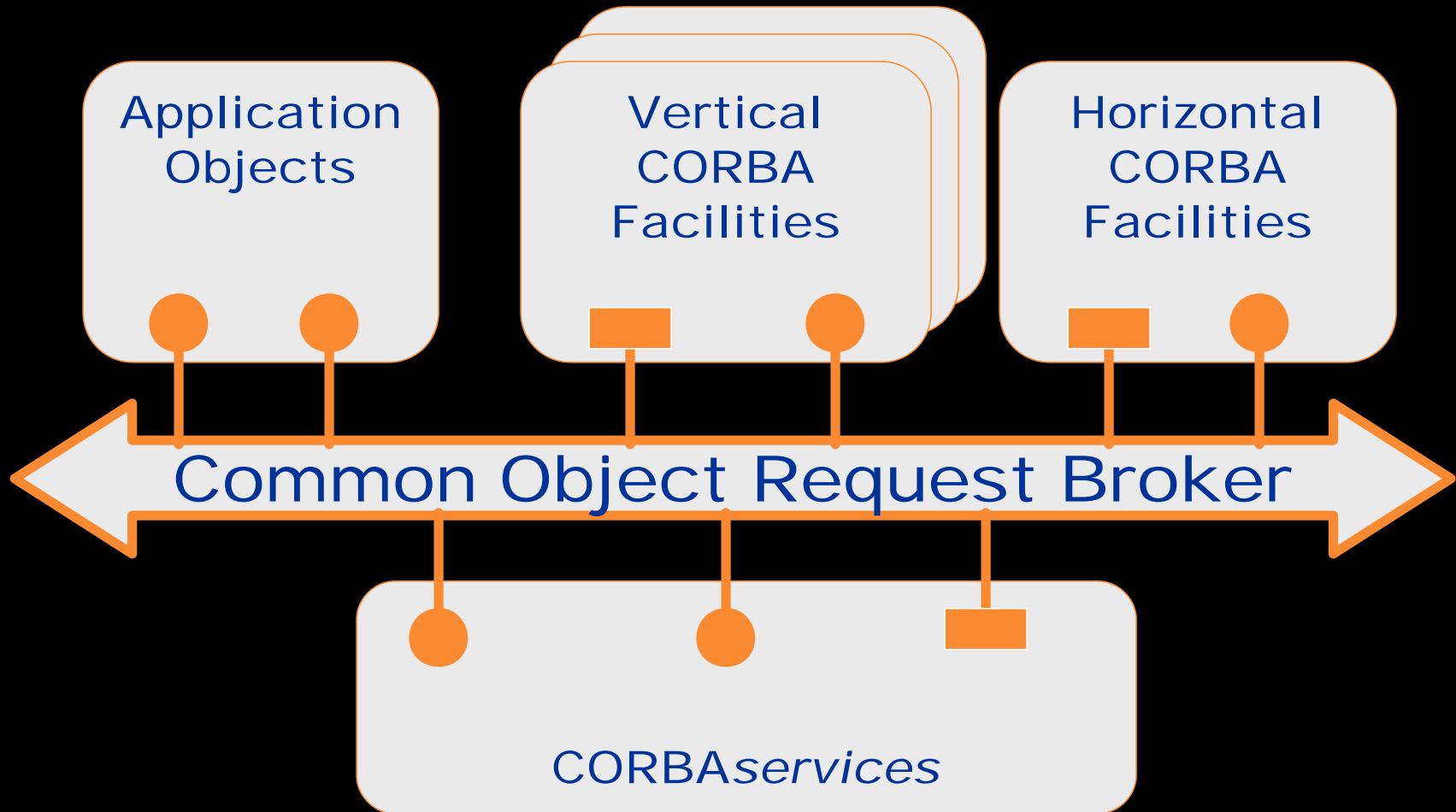


Fine Grained CORBA Services to Build Scalable DRT&E Architectures

Victor Giddings
Objective Interface Systems, Inc.
victor.giddings@ois.com



Object Model Architecture





CORBA Services

- ◆ “The CORBA Services component standardizes the life cycle management of objects.”
- ◆ Defined in a set of specifications:
 - ❑ Additional Structuring Mechanisms for the OTS
 - ❑ Collection Service
 - ❑ Concurrency Service
 - ❑ Enhanced View of Time
 - ❑ Event Service
 - ❑ Externalization Service
 - ❑ Licensing Service
 - ❑ Life Cycle Service
 - ❑ Lightweight Log Service
 - ❑ Management of Event Domains
 - ❑ Naming Service
 - ❑ Notification Service
 - ❑ Persistent State Service
 - ❑ Property Service
 - ❑ Query Service
 - ❑ Relationship Service
 - ❑ Security Service
 - ❑ Telecoms Log Service
 - ❑ Time Service
 - ❑ Trading Object Service
 - ❑ Transaction Service



Monolithic CORBA services

- ◆ Most CORBA services implementations have been monolithic servers

- Single standalone process or program
- On first examination, makes some sense
 - Interface, implementation, and execution environment delivered in one package
 - Persistence, recovery, etc. features bundled into server
- Reinforced by `resolve_initial_references` mechanism

`The_Event_Channel =`

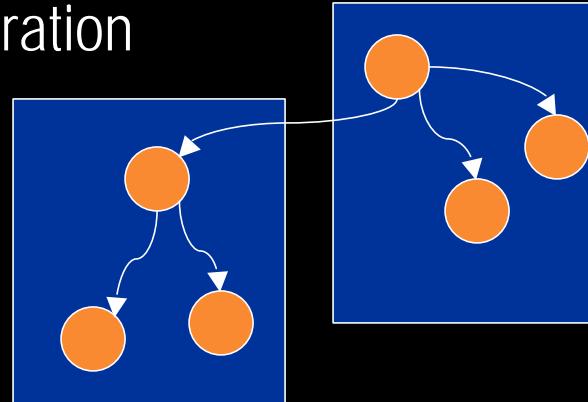
```
CosEventChannelAdmin::EventChannel::_narrow(  
    orb->resolve_initial_references("EventService") );
```

- Only one
- Statically configured by Object URL or proprietary means



Fine-Grained CORBA services

- ◆ But, services are specified in “fine-grained” manner
 - Service interfaces are (fine-grained) CORBA objects
 - Location-transparent
 - Could be in same process as client of service
 - Services include features for collaboration or composition
 - Name Service – federation



- Event/Notification
 - ❖ Separation of administrative interfaces from producer and consumer interfaces
 - ❖ Setup deliberately more complicated than needed – in order to support “joining” of event channels



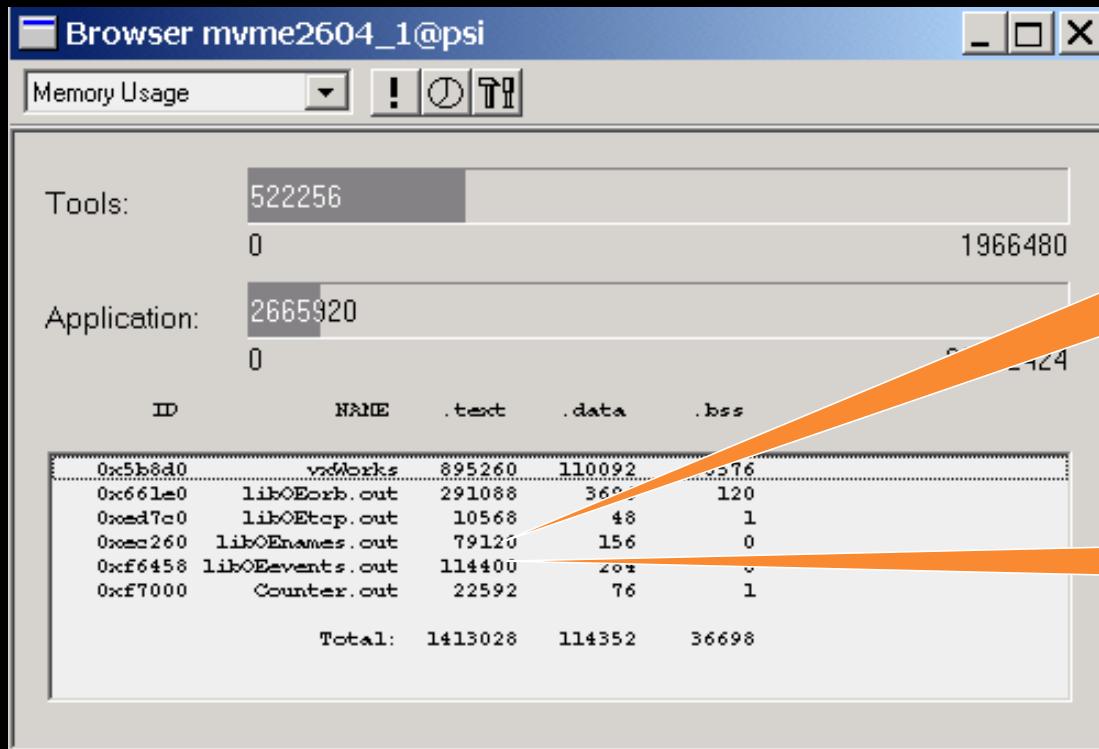
Fine-Grained CORBA services “Obvious” Advantages

- ◆ **Embedded systems may not have**
 - Resources for separate processes
 - Processes (single address space O/Ses)
 - Disks for persistent storage
- ◆ **Fine-Grained services can be delivered as library-based implementations**
 - Can be integrated with ORB-provided and user-selected
 - Alternate transports
 - Real-time CORBA feature usage
 - ❖ Banded connections
 - ❖ Priority propagation
 - Security
 - “Collocation” optimizations



Fine-Grained CORBAservices Example Implementation

- ◆ ORBexpress Names: Embedded Objects & ORBexpress Events: Embedded Objects
 - Library-based implementations
 - Relatively small footprint

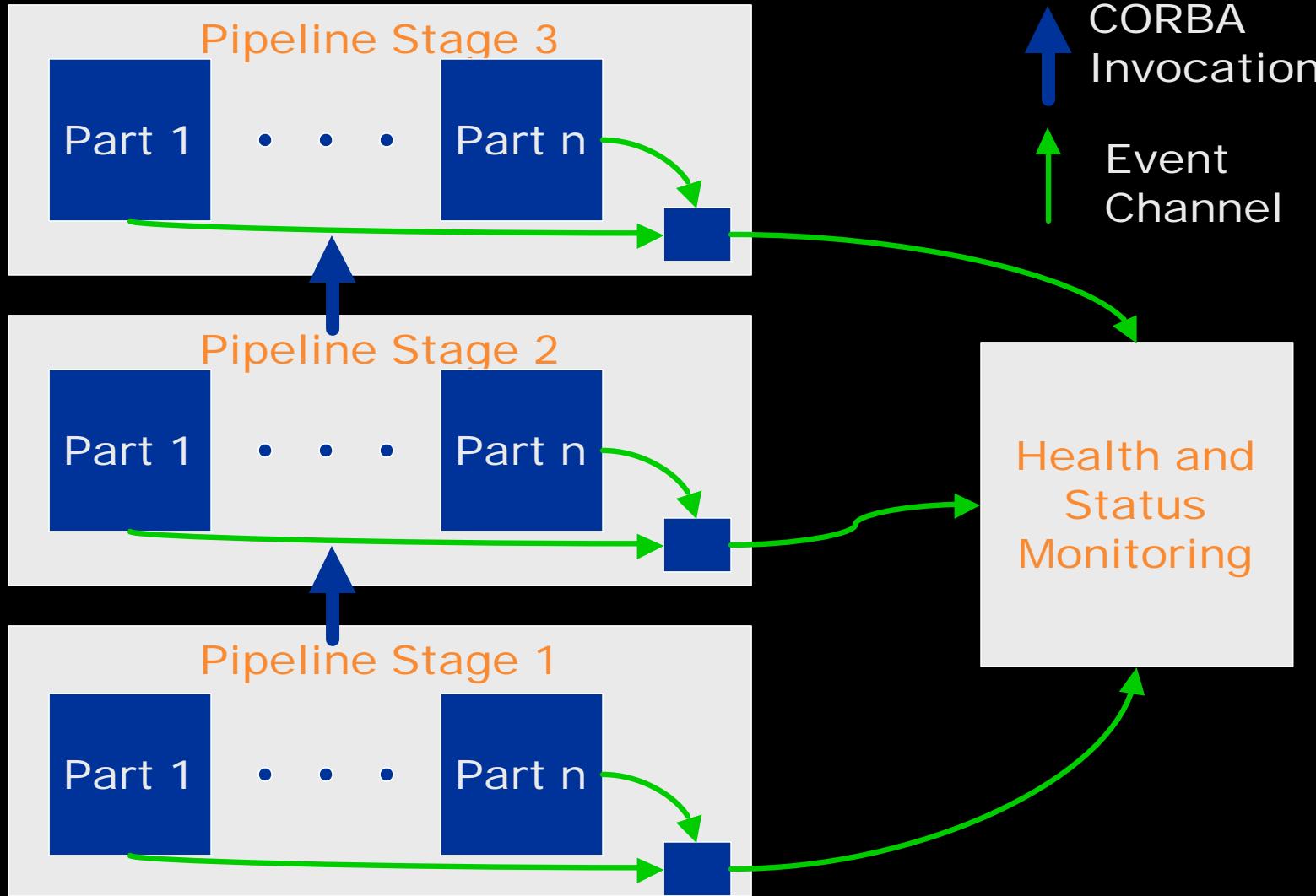


Names Library: 80K

Events Library: 115K

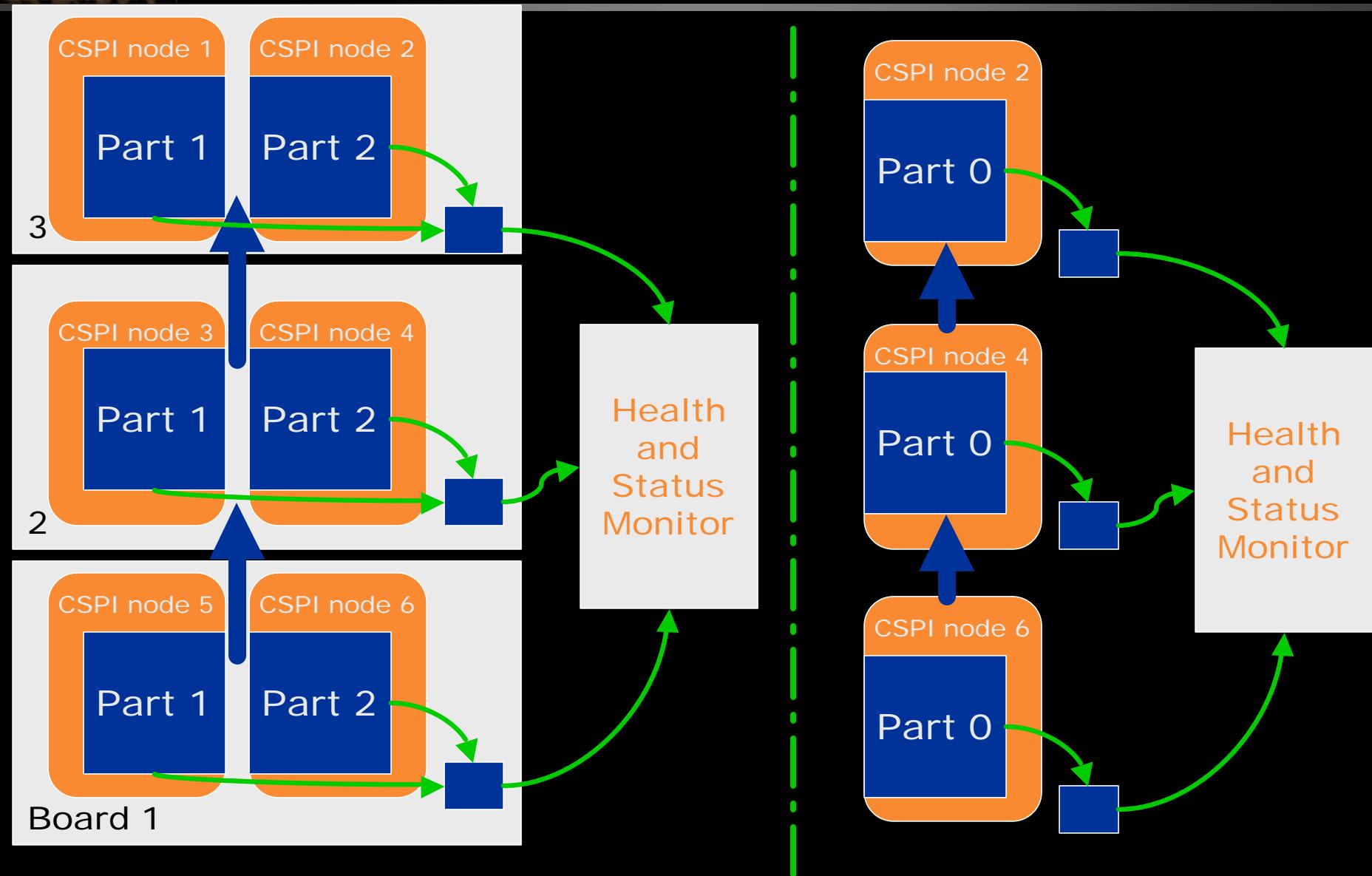


Prototype Application – Functional View



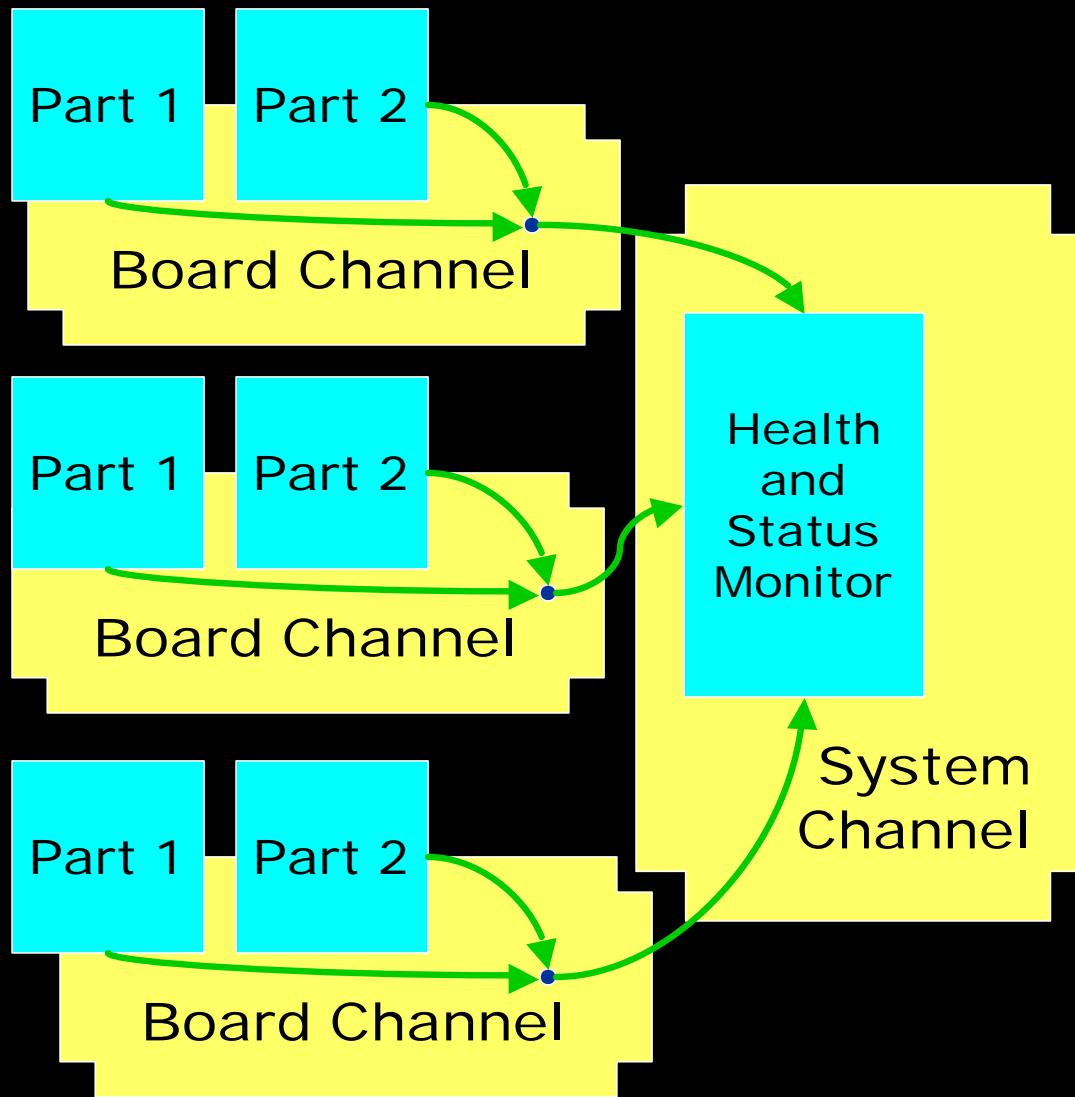


Prototype Application - Two Physical Configurations



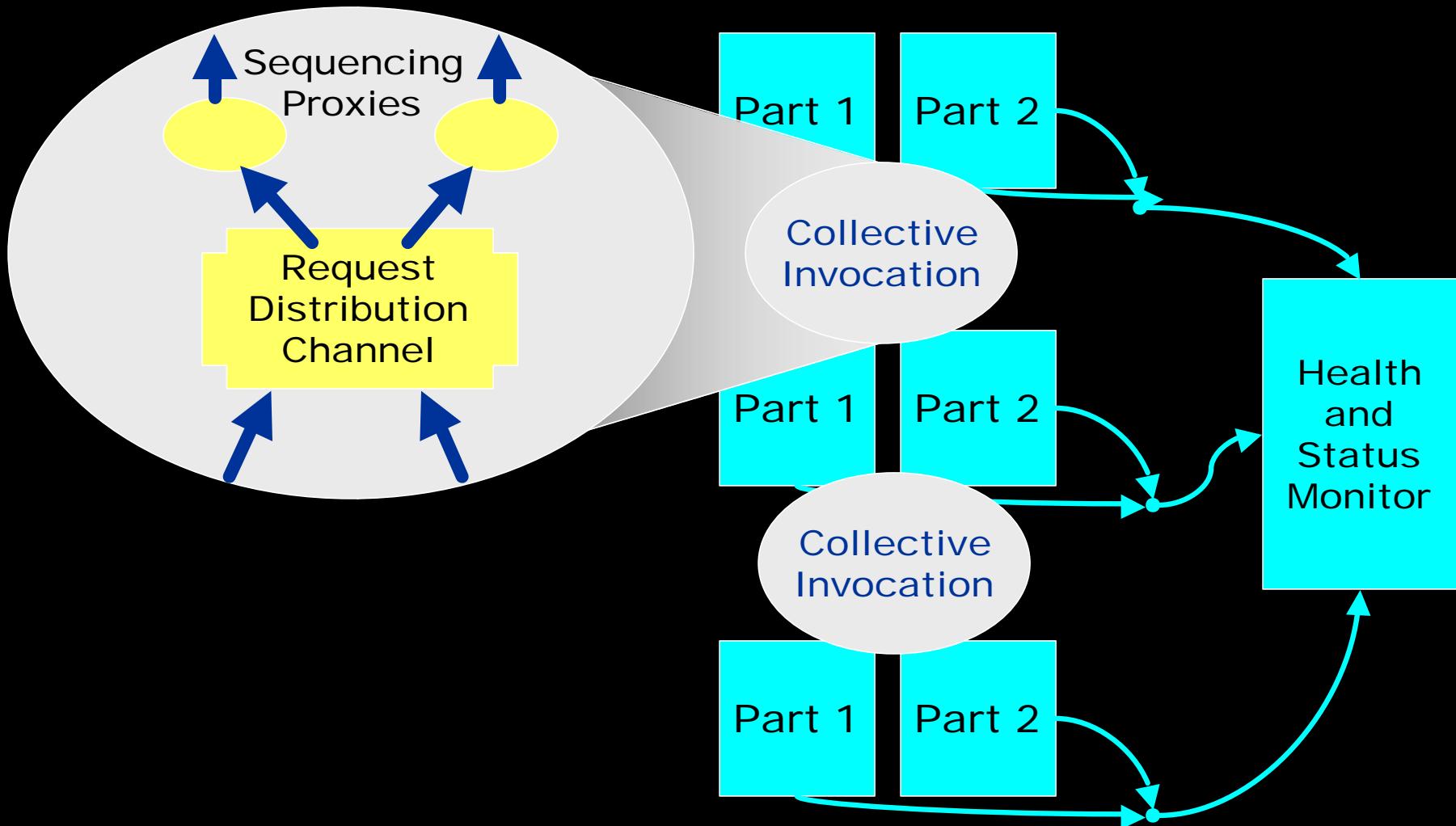


Prototype Application Using "Chained" Event Channels



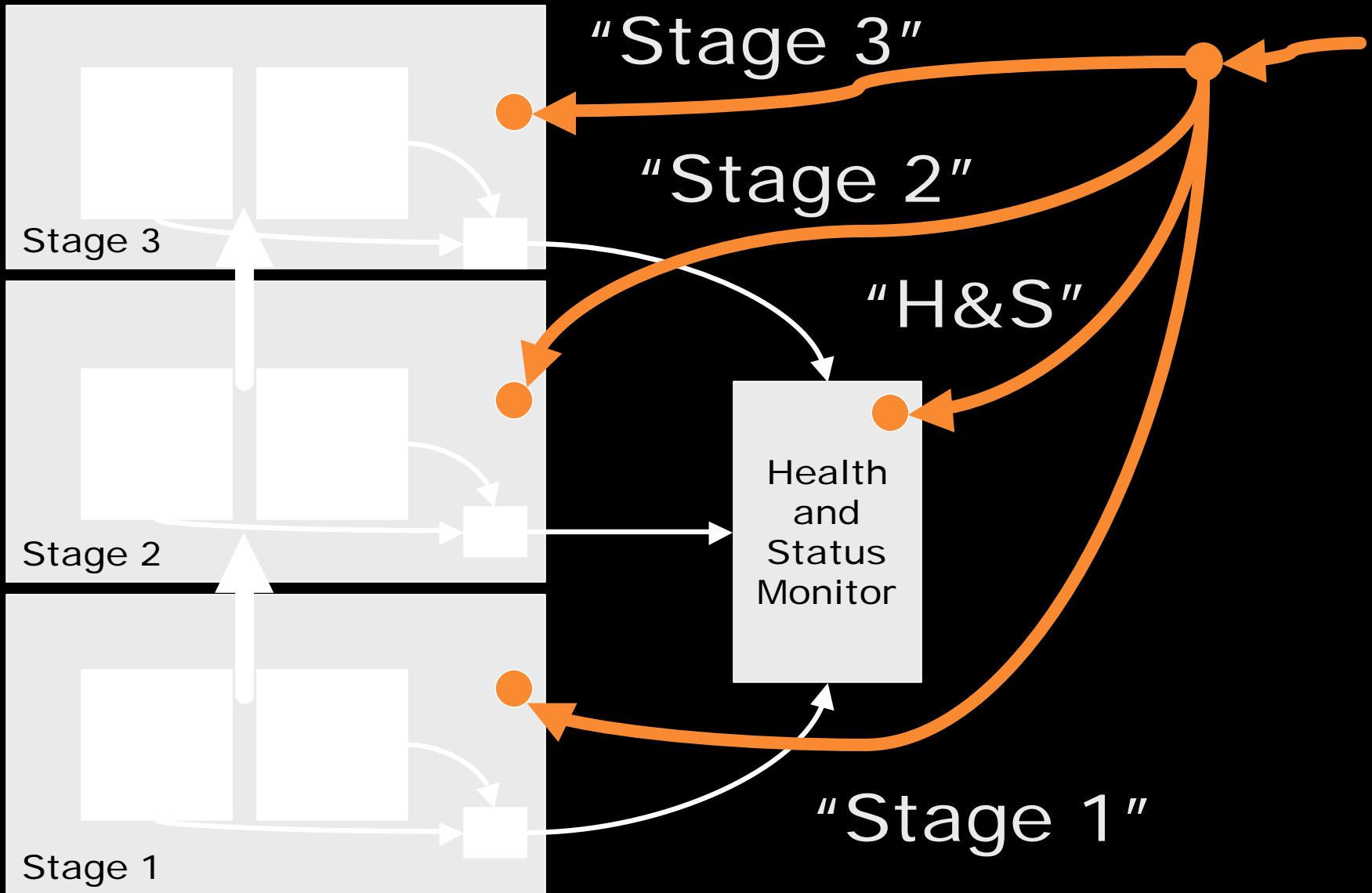


Prototype Application Using "Local" Event Channels



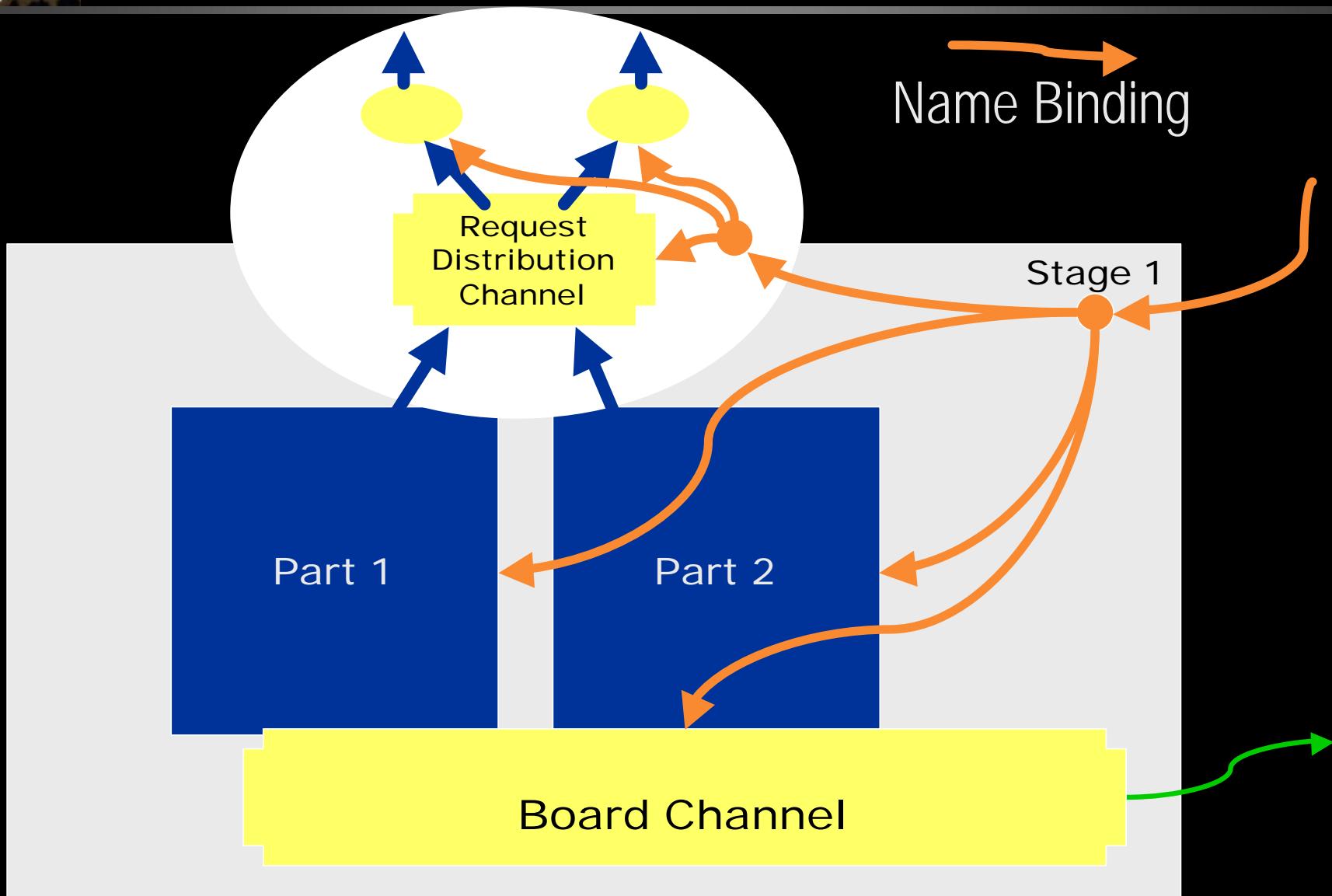


Using Fine-Grained Name Service to Reflect Components





Using Fine-Grained Name Service for Sub-Components





"Architectural Glue" in Prototype Application

◆ Fine-grained event service

- "Chained" event channels – on-board channel feeds system channel
- "Local" event channels – single-typed channel provides data transfer for collective invocation

◆ Fine-grained name service

- "Federated" fine-grained name services reflect
 - Application structure
 - Application deployment
 - Sub-component structure and implementation
- Simple naming convention allows reflection and dynamic query



Fine-Grained CORBA services What is Missing?

- ◆ **Library-based Implementations**
- ◆ **Factory interfaces**
 - Name Service - can't create a NamingContext without a reference to a NamingContext
 - Event Service – no factory for EventChannel (addressed in Notification Service)
- ◆ **Location controls**
 - new_context creates NamingContext at same location as "parent" NamingContext
 - ConsumerAdmin, SupplierAdmin and Proxies will be created collocated with EventChannel
 - Deployment and Configuration Specification??