UrbanFlood

CIS – a Software Framewok for Early Warning Systems

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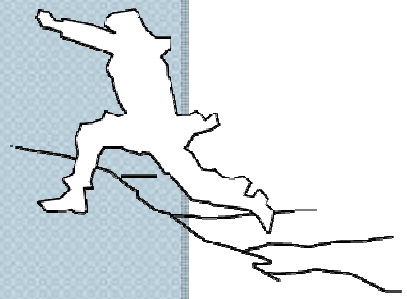

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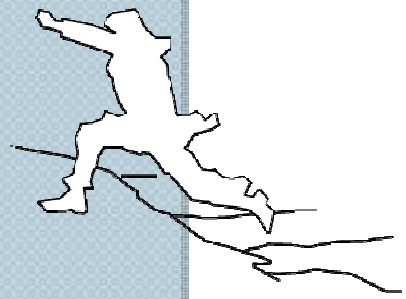
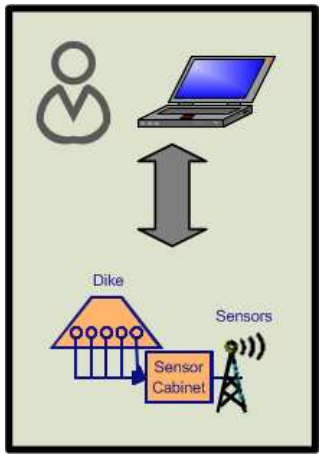
Plan

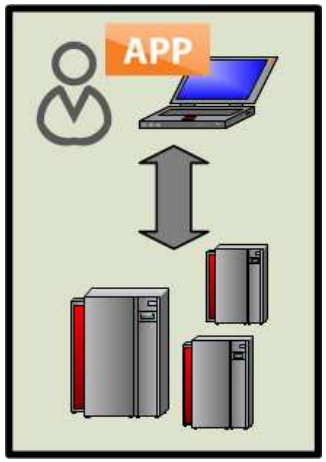
- Motivation
- The approach: Service-Oriented Framework for building complex systems
- The Common Information Space
- CIS-powered Flood Early Warning System



Motivation

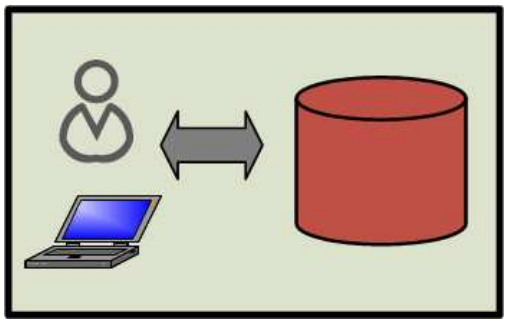


Dike +
Sensor data



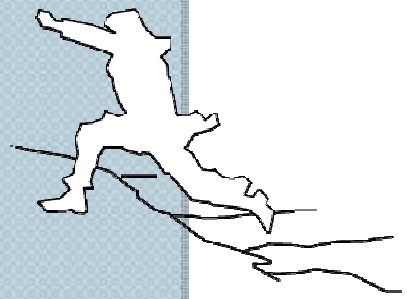
Flood simulation +
Local HPC resources

Data sets
(e.g. terrain topography)



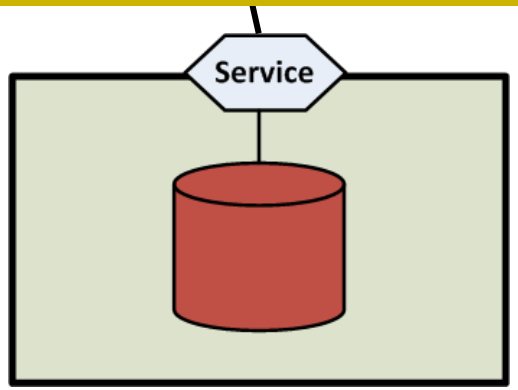
Motivation

- Bring together many resources needed in a complex system
- Early Warning System = sensors + ICT infrastructure + domain models
  - E.g. Flood EWS = dike sensors + hardware & software + dike stability / AI / inundation / … models



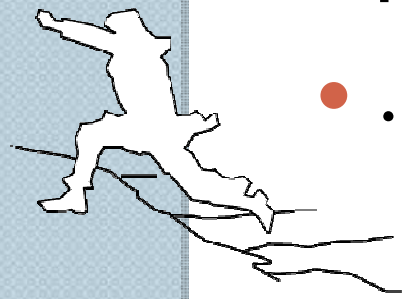
Service-Oriented Approach

Exposing resources as services: first step towards complex systems



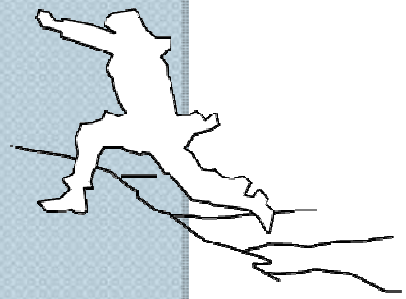
Towards complex systems: common problems

- Foundations for software services
- Communication between services
- Coordination of execution (workflow)
- Monitoring & management of services
- Allocation of resources to services
- Fault tolerance
- Provenance tracking
- ….

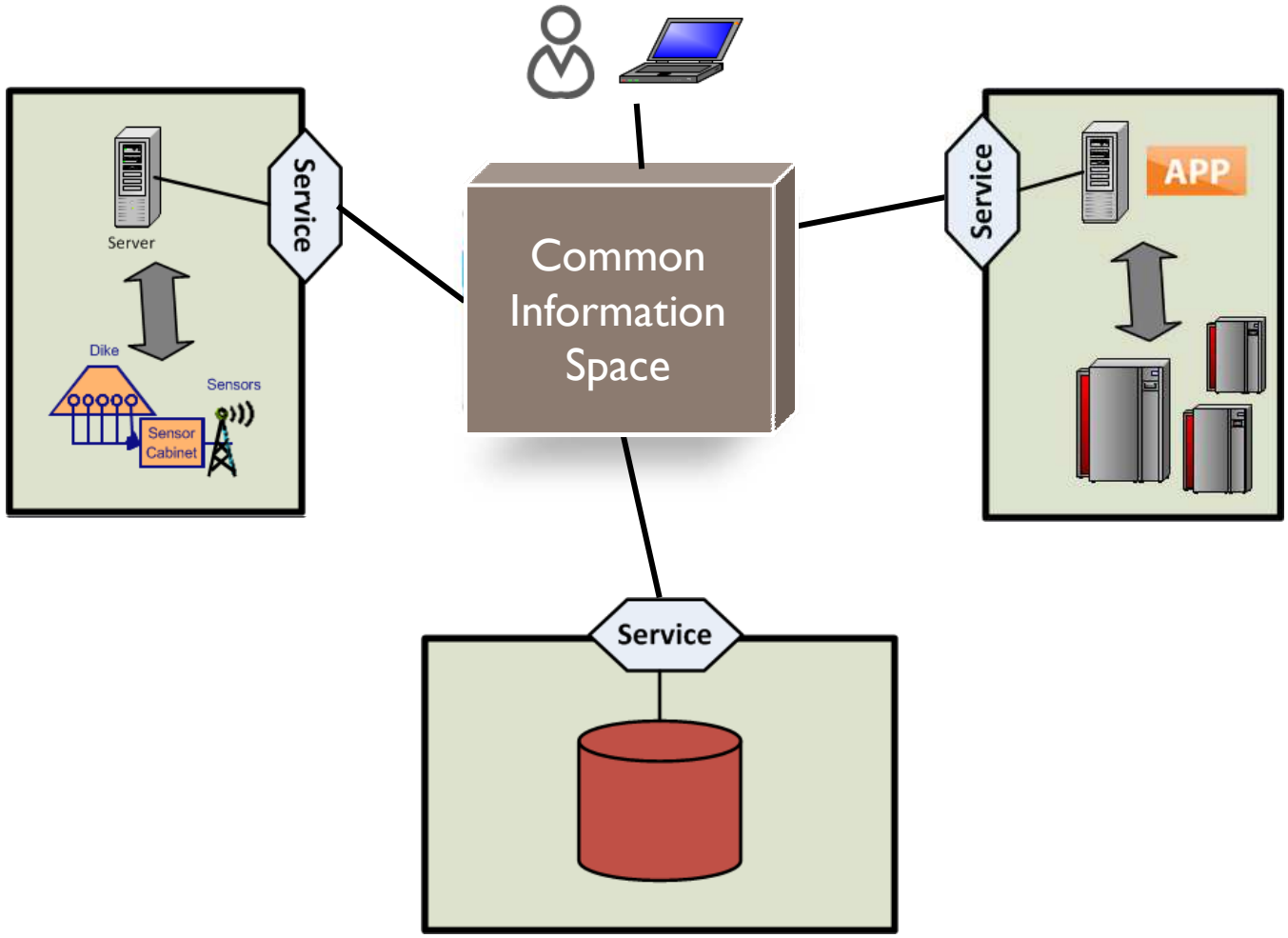


Role of a software framework

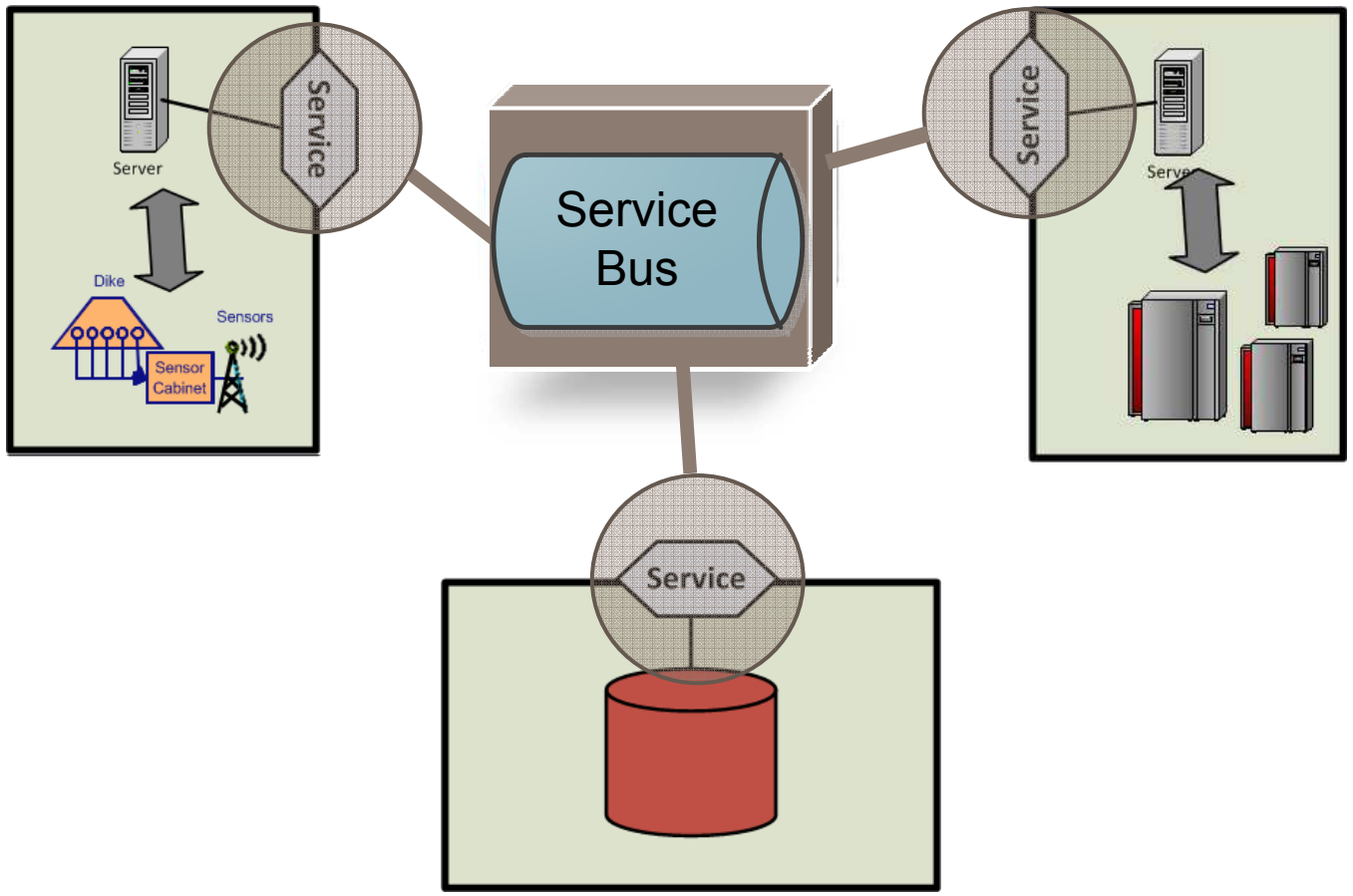
- Framework solves common problems of a specific type of systems
- Creators of concrete systems need to provide only system-specific logic
- CIS: software framework for Early Warning Systems



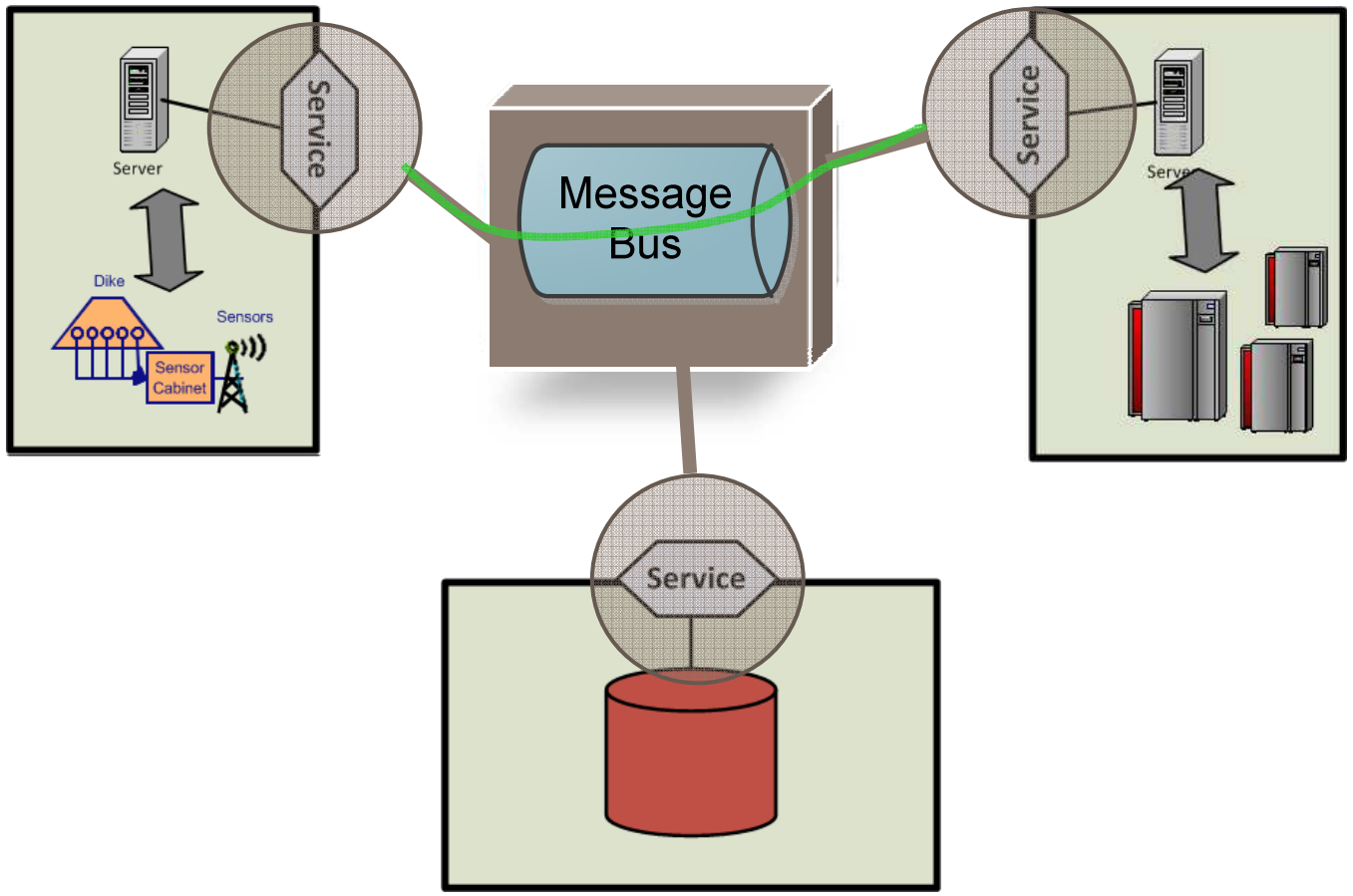
Common Information Space



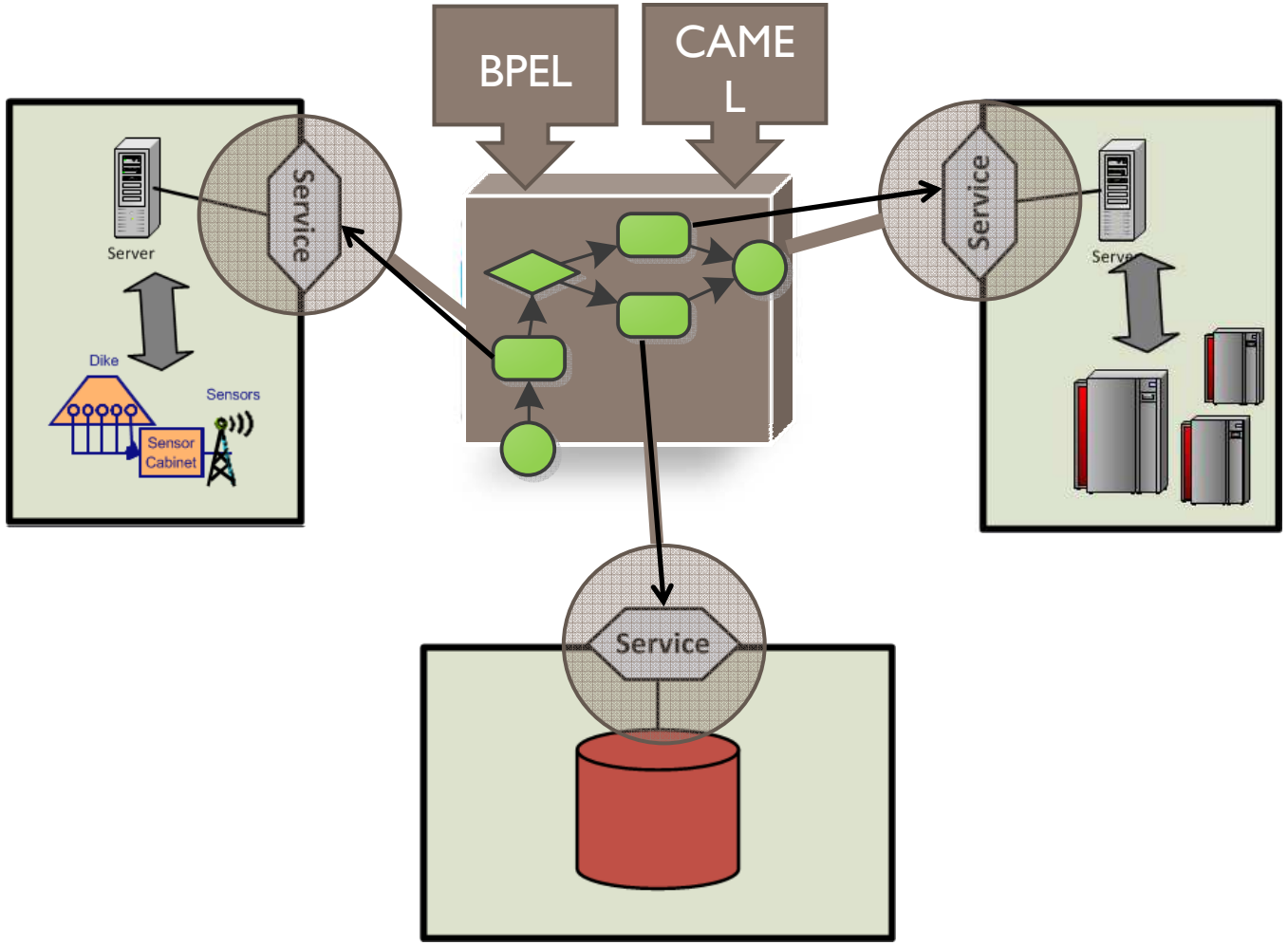
CIS: Service foundations



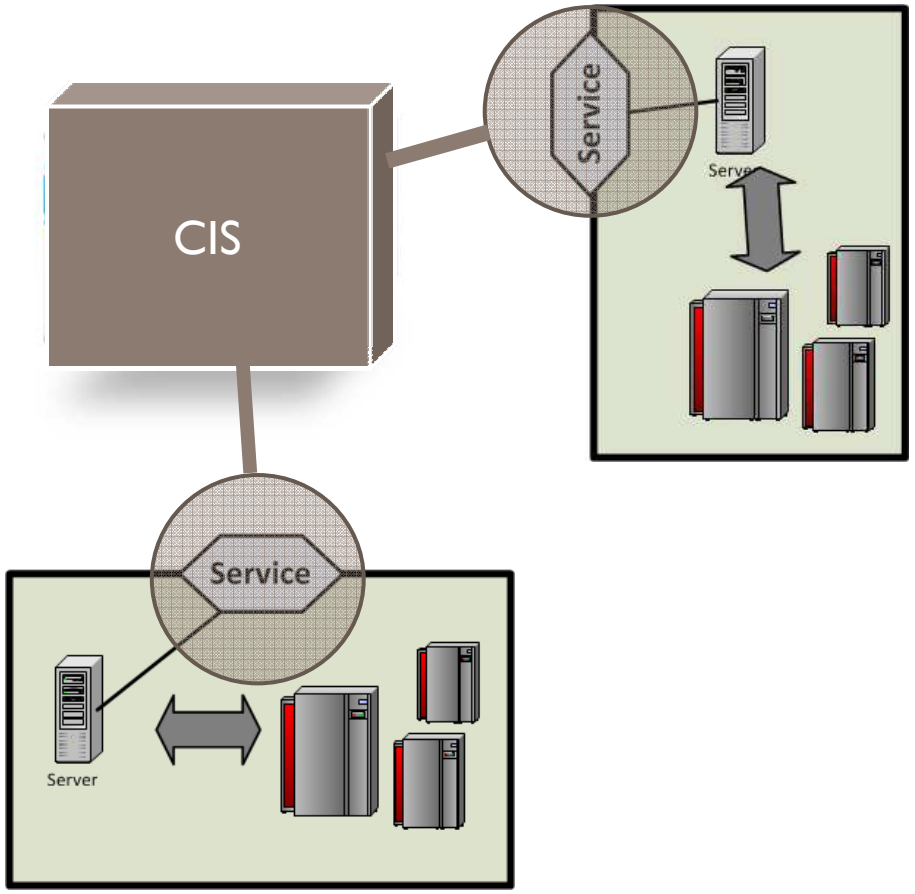
CIS: Communication



CIS: Coordination



CIS: Leveraging clouds



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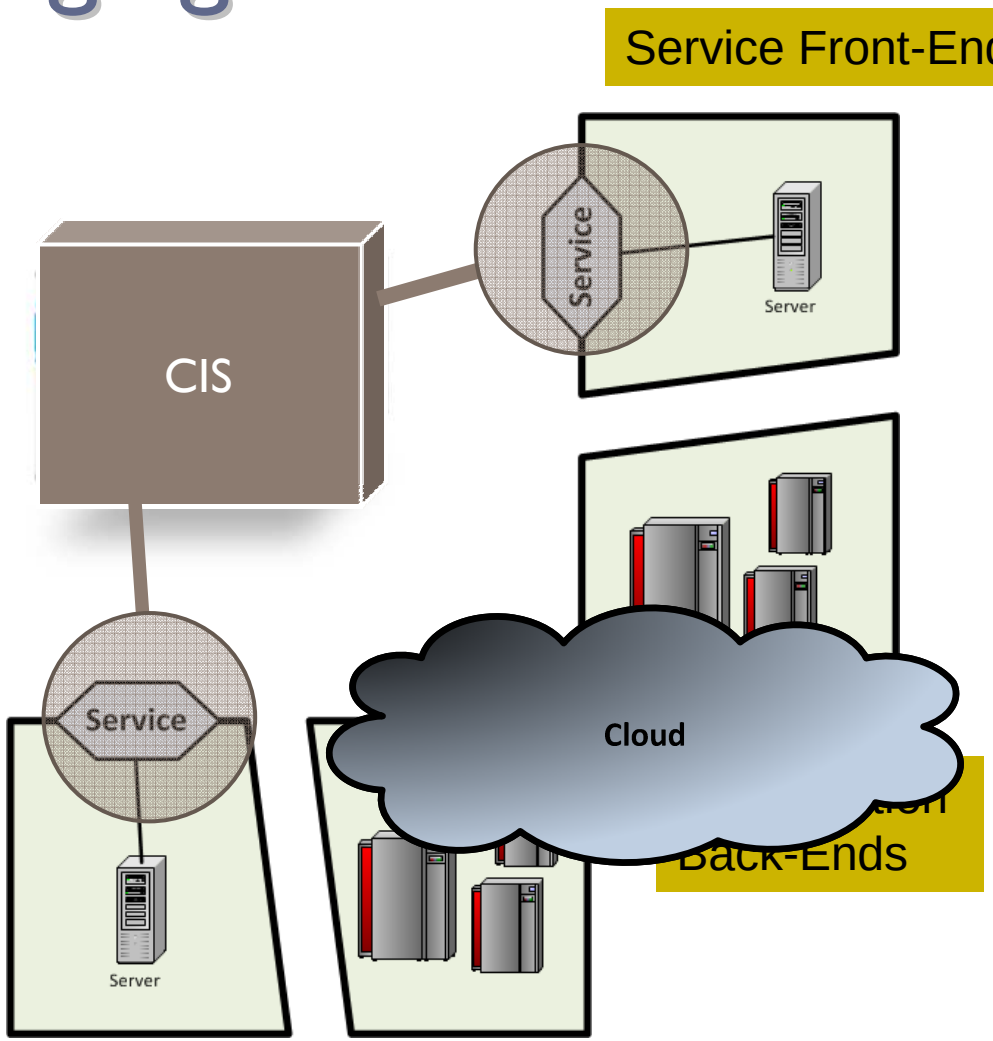

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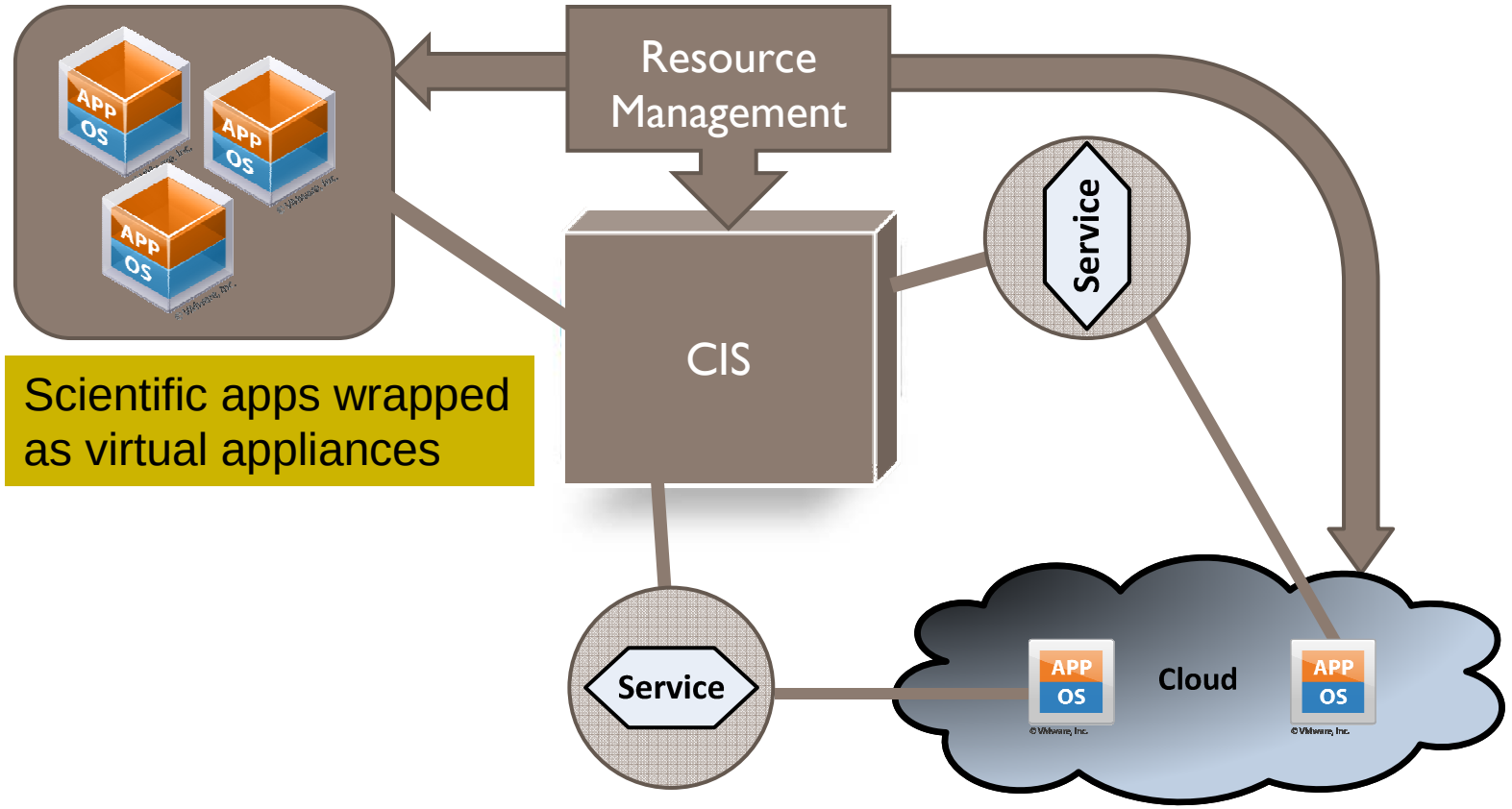
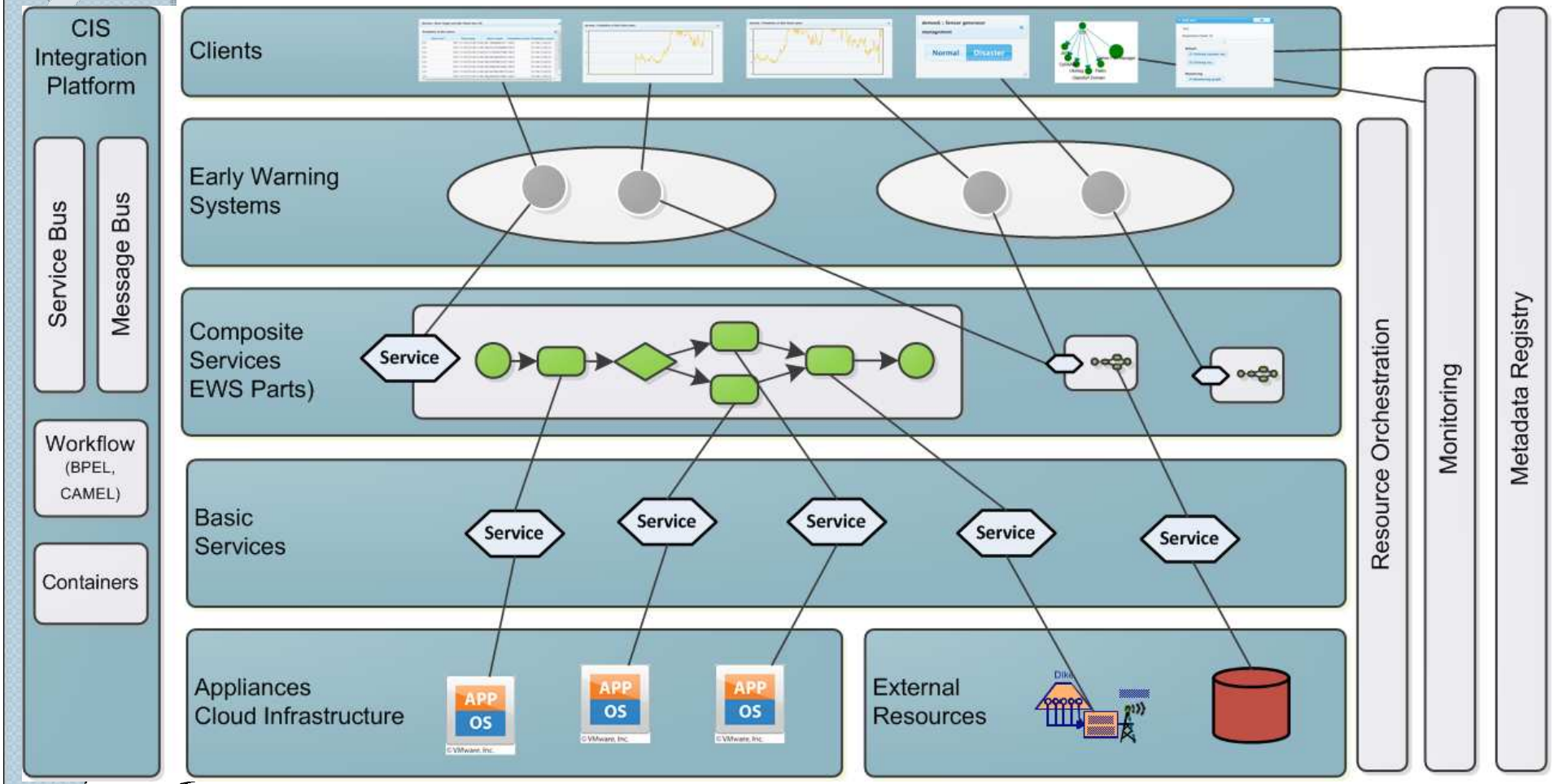
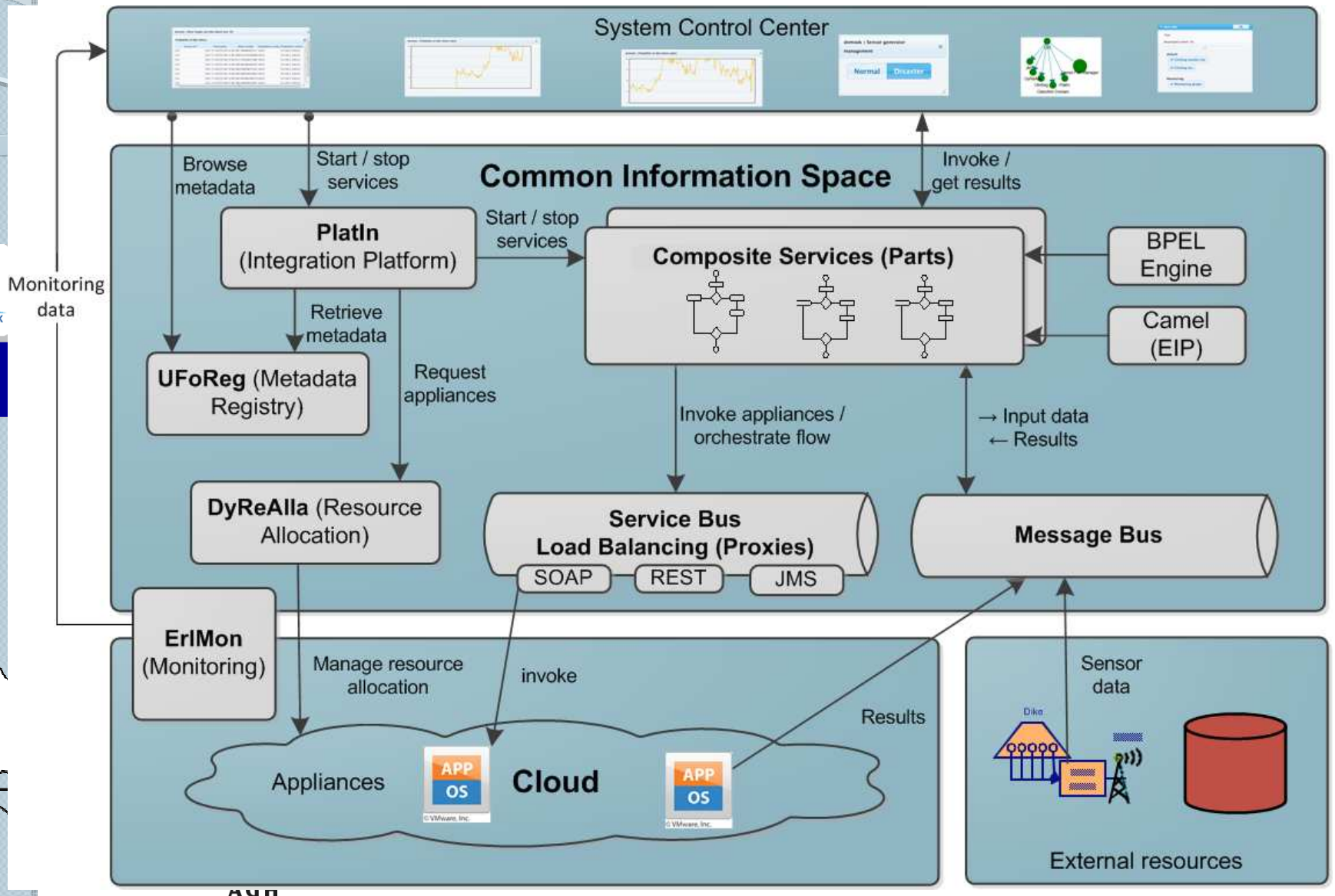


Scientific apps wrapped as virtual appliances

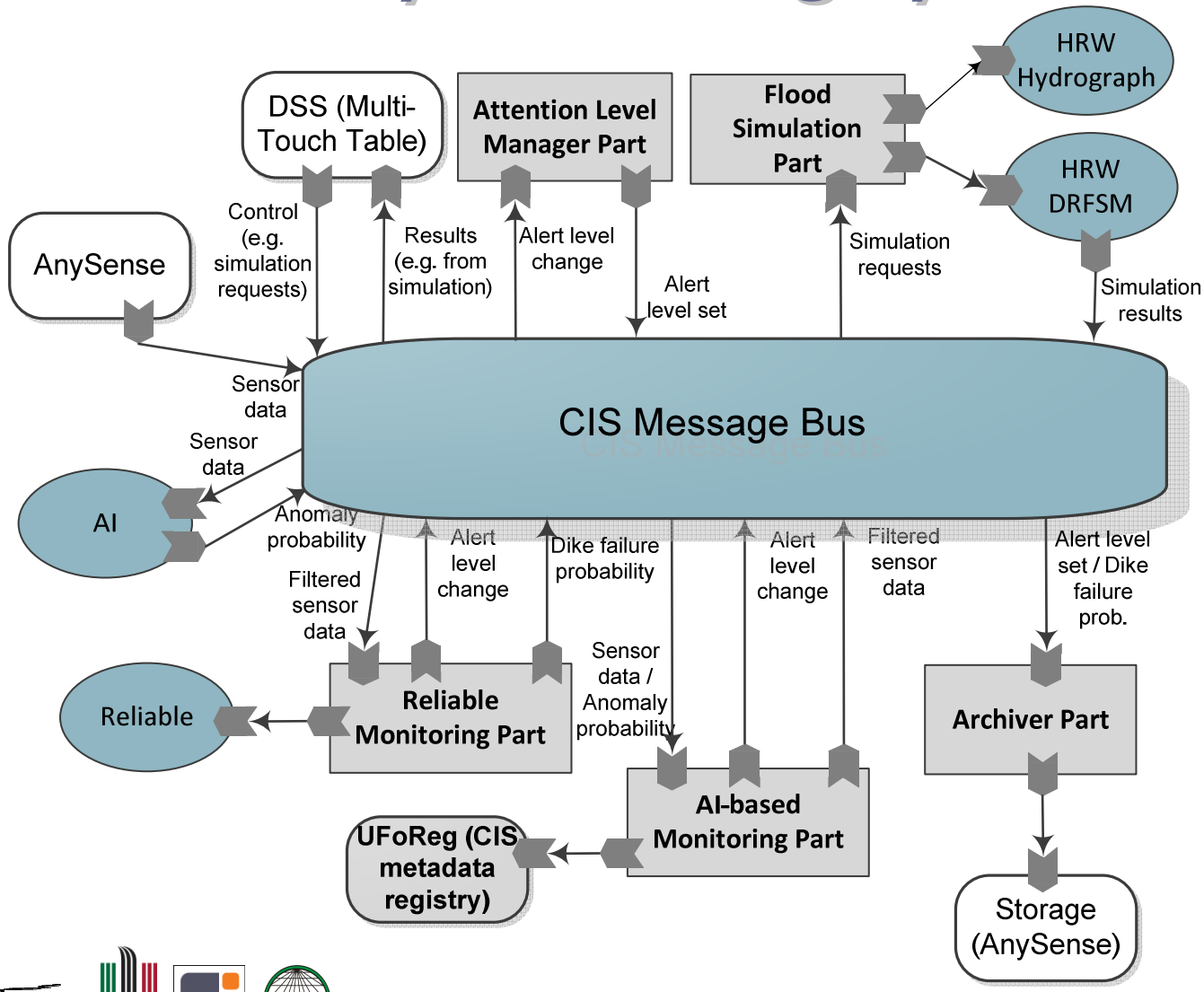
CIS-powered System



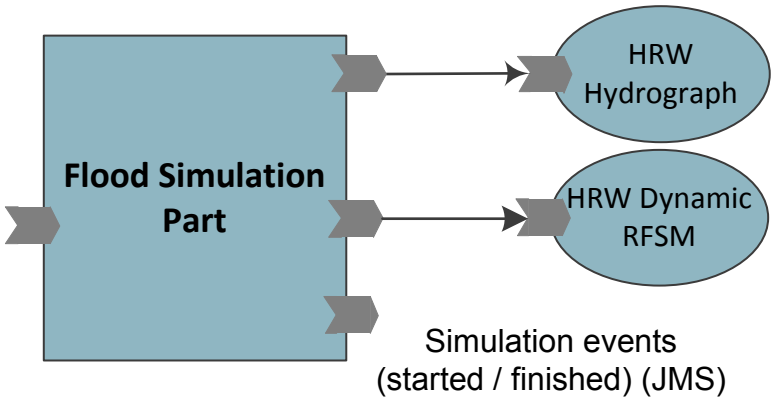
CIS Architecture



Flood Early Warning System



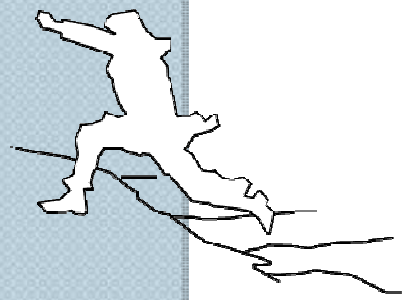
Service example: inundation simulation (Flood simulation part)



- Two legacy apps exposed as one convenient service
- BPEL integration
- Input: simulation specs
- Output: series of messages with simulation results

Conclusion

- CIS helps quickly build complex systems by providing solutions to common problems
- Service-Oriented approach
- Management of computation backends – leveraging clouds



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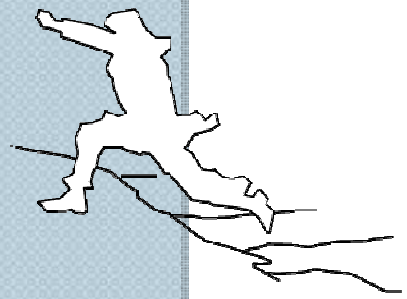
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