

Customized Service Platforms

Architectural Issues

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Patterns

Static Feature Toggle `#ifdef`

Code Branches

Dynamic Feature Toggle `if (config) {}`

Strategy Pattern

Aspects

Mashups (Widget composition, personalization)

Plugin Extension Point

Dynamic Service Selection and Composition

Autonomic Controller

Customization Times

Delay taking architectural decisions so that taking them later will allow someone else to customize the architecture

Very Early (design time, select-integrate-test)

Early (compile)

Deploy

Startup (initialization)

Late (runtime before failure)

Very late (runtime after failure)

Customization and Interfaces

Functional Parameter

(Interface allows to customize the service)

Non-Functional Parameter

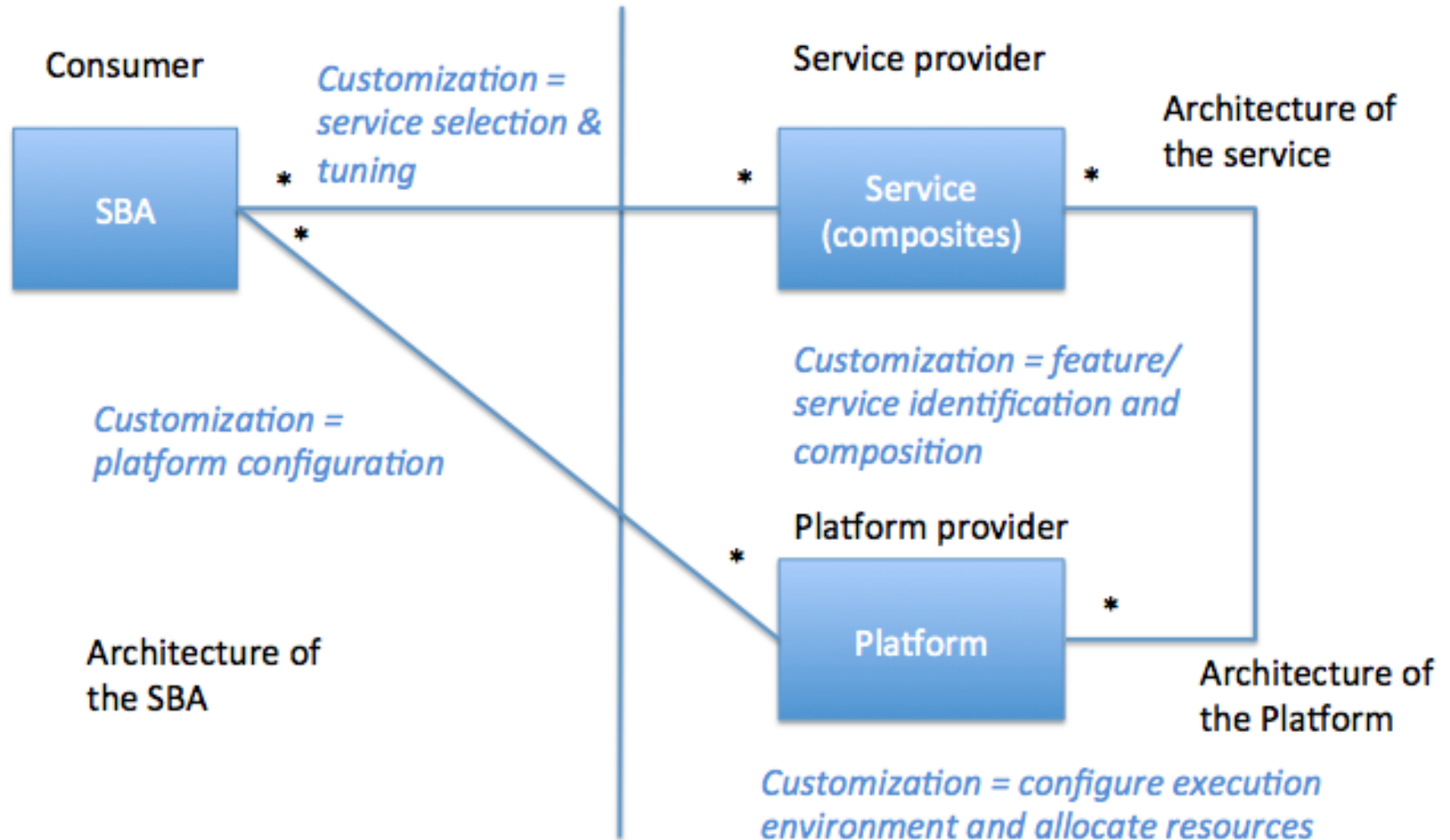
(e.g. Job submission metadata)

Orthogonal Concern

(Service interface is not aware)

Platform Customizes the service based on customer requirements, constraints, session, profile, negotiated pricing/billing deal

Customization context



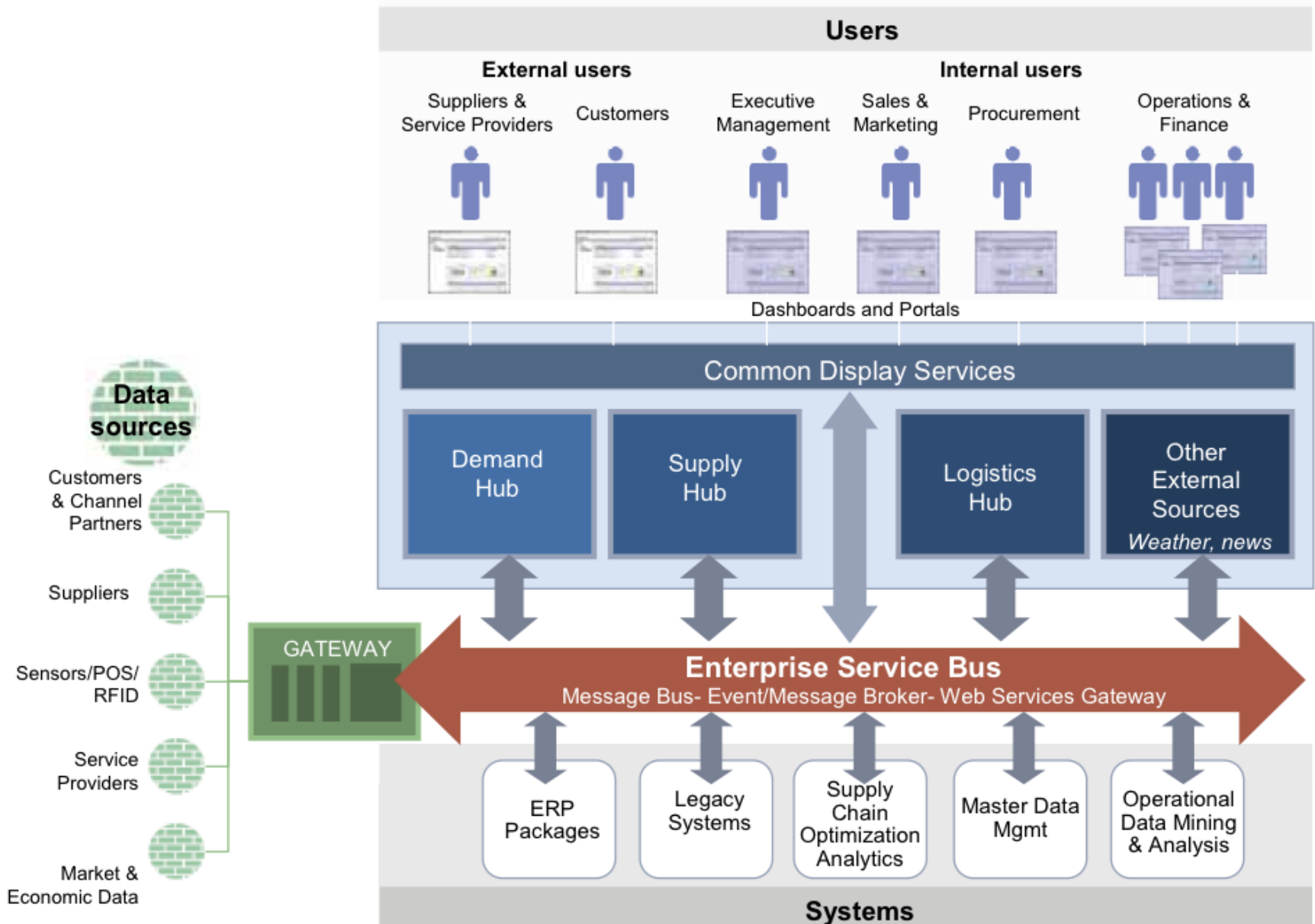
Examples

ING Bank customer services (Design time)

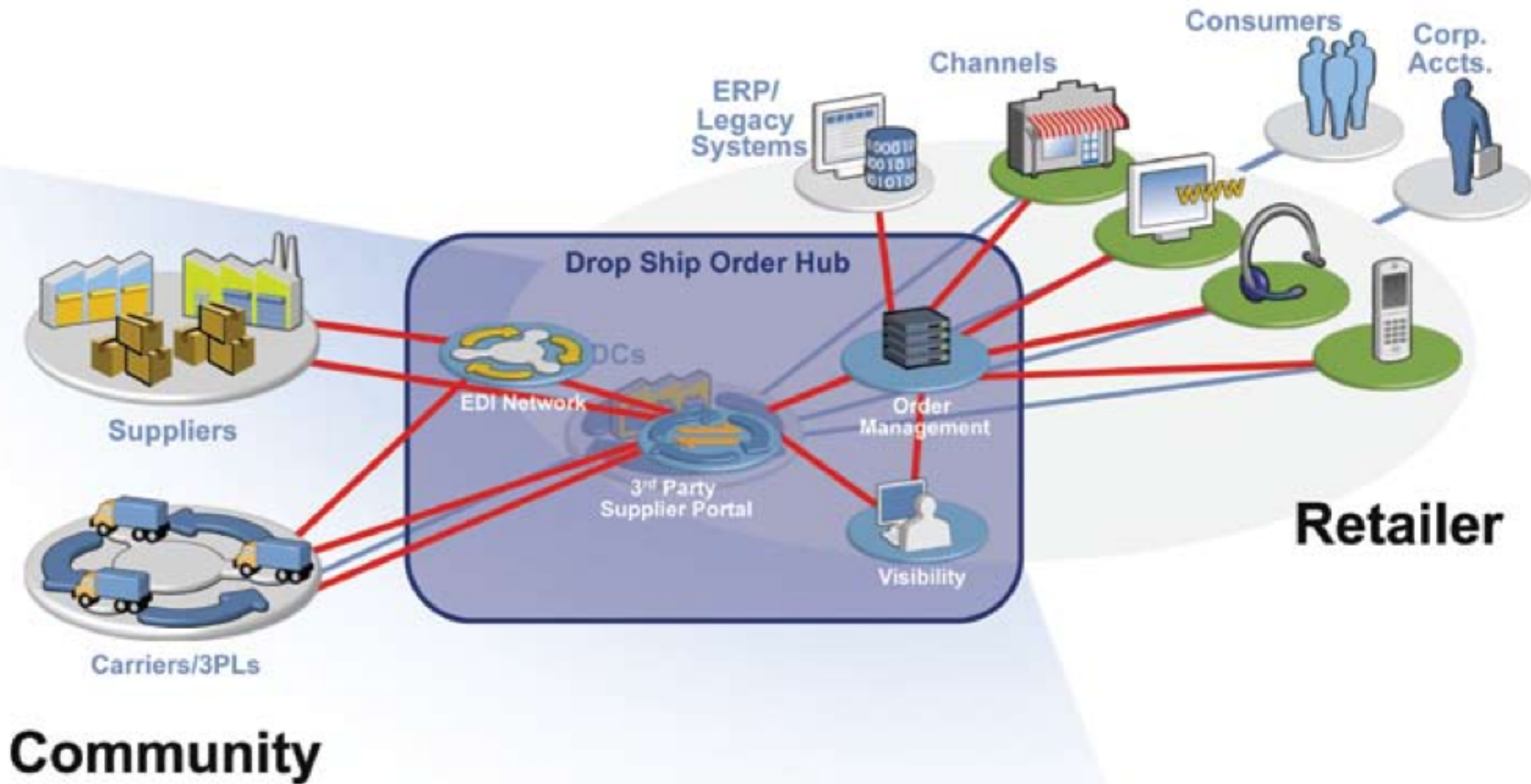
Order Management (Deployment)

Emergency, Disaster Management (Runtime)

Example - Design-Time



Example - Deployment-Time



Example - Run-Time

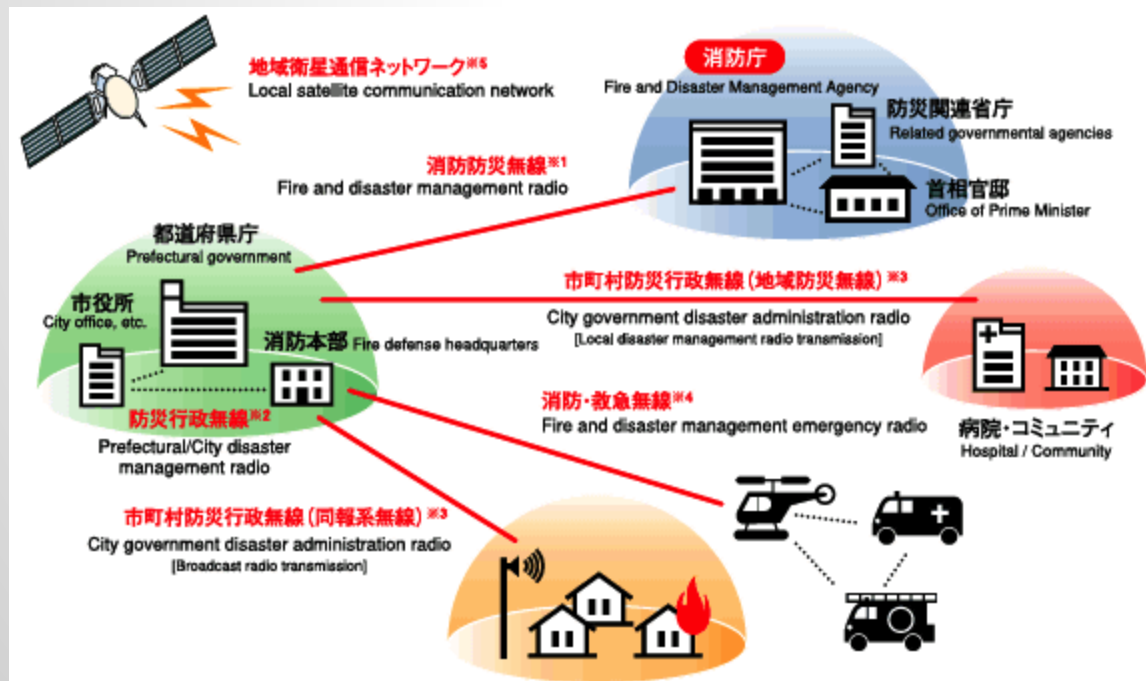


Runtime Customization

Example Scenarios

Emergency Response

"Share resources among multiple platforms/partners to handle peaks in demand"



CUSTOMIZED ARCHITECTURE

- ※1 This is a communication network connecting the central government (Fire and Disaster Management Agency) and prefectural and city governments.
- ※2 This is a radio transmission network connecting prefectural governments, city governments and fire defense headquarters.
- ※3 [Broadcast radio transmission]: Communication network for residents
[Local disaster management radio transmission]: To be used for communications among disaster countermeasures office, disaster prevention agencies, governmental agencies and daily life organizations.
- ※4 It is used to collect and transfer information between Fire Defense Headquarters (Fire Department) and fire engines and ambulances.
- ※5 This is a communication network to connect Fire and Disaster Management Agency, prefectural governments, city governments and other disaster management organizations by using communication satellites.

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A style for customization

Loose coupling

Fine-grained decomposition

Explicit variation points

Open Questions

- How to distill an architectural style for customizable service-oriented architectures?
 - Compile-time configuration vs.
deployment-time customization vs.
run-time adaptation
- On customising service platforms for networked organizations
 - What are the organizational constraints to be maintained at software architecture level?
 - How can the architecture foresee customizable deployment topologies?

Conclusion

Customizability is a key quality attribute for software architectures

Customizability may break the service abstraction (since it requires consumers to control the service provisioning platform)

Control over customization expressiveness is important for industry acceptance

Architecture and Customization

What have we learned?

- Architecture plays an important role; it has implications for customizability
- But nothing particularly unique in this context. It depends on the ingredients that you pick and choose for a particular use case

Architecture and Customization

- No end to what could potentially be done with services towards dynamic & seamless customization in an open-world context).

- In practice this potential is not fulfilled by current platforms/products/solutions.

e.g., SPLE, Ecosystems

- Is it really needed in practice?

References