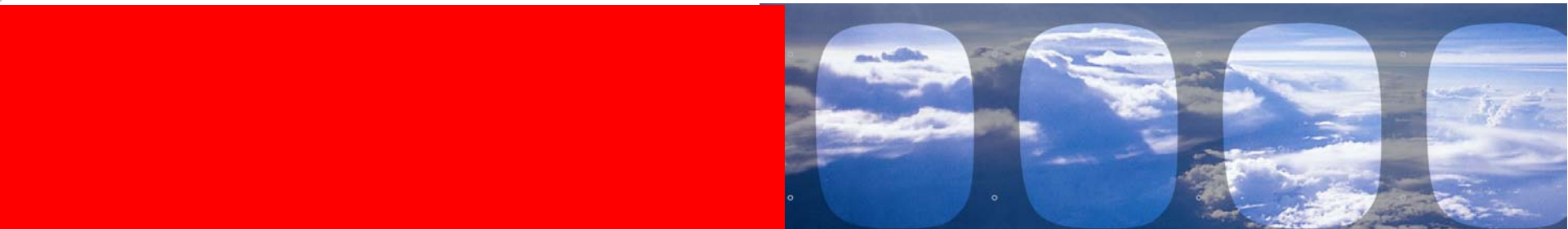


Connecting people with the world's greatest travel possibilities



Teaching Esperanto at the Tower of Babel

Implementing SOA Strategy at Sabre

CamelOne

May, 2011

Technology Scale

32,000

Transactions every second

500 million+

Transactions every day

100,000+

Computers

accessing Sabre travel
content globally

Leading provider of
travel technology
products and services
on the planet

1 million

Transactions every
minute

180 million+

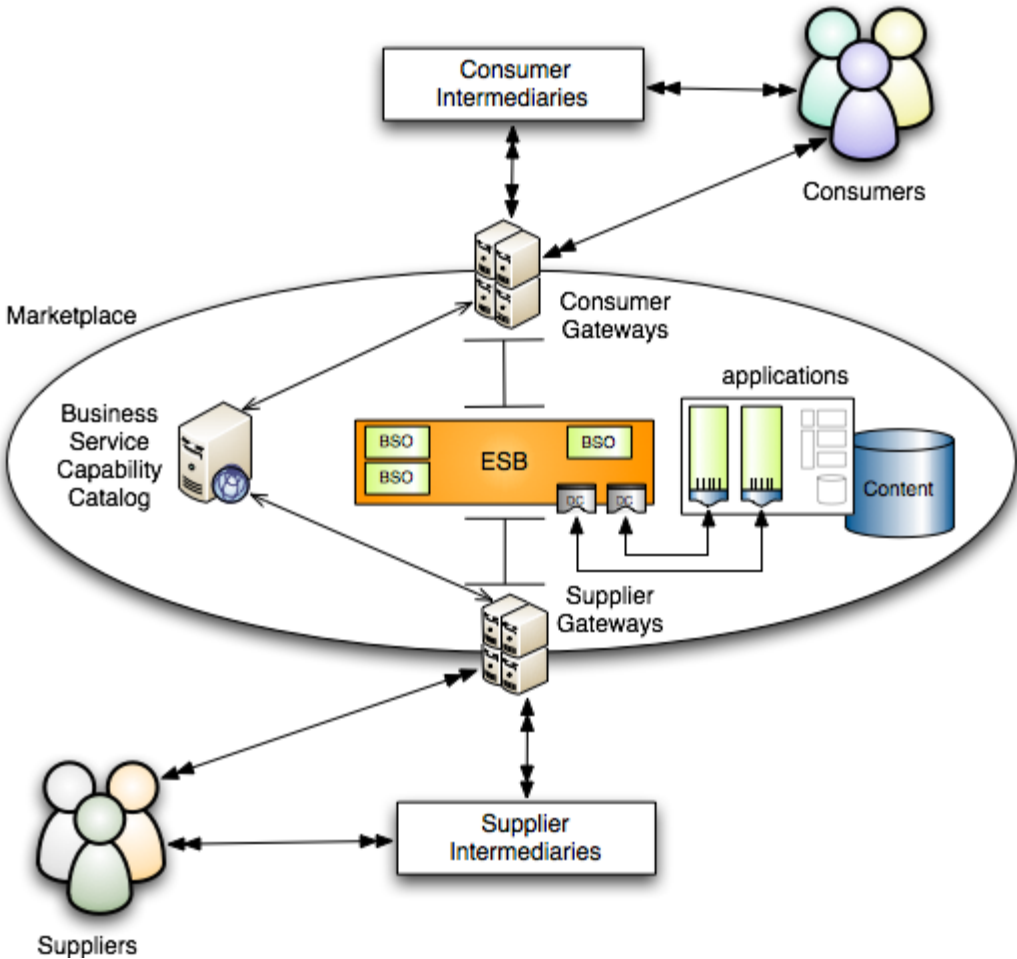
Transactions every day
via Web services

24 hours

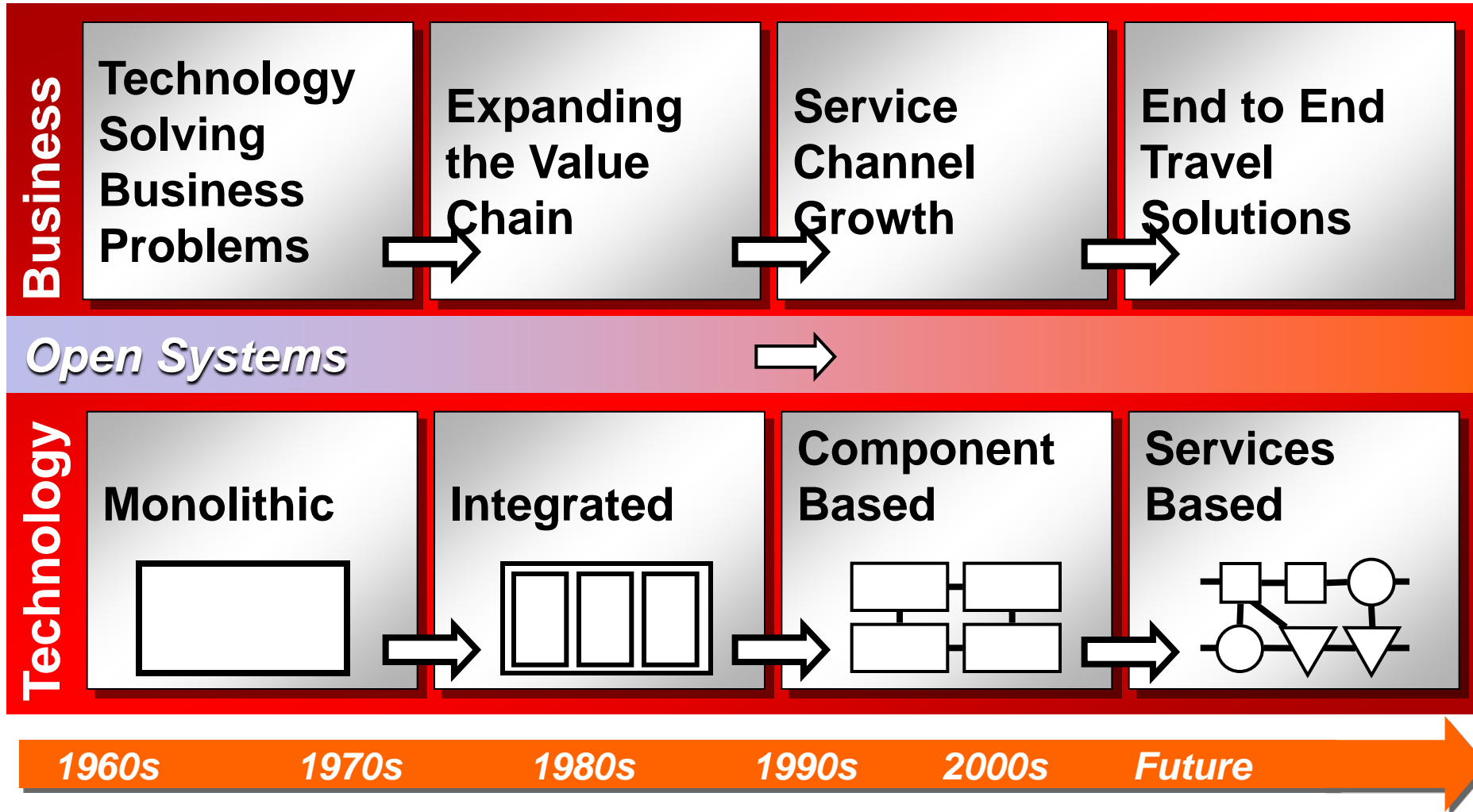
Every day — seven days
a week

It's Always Peak Hour Somewhere In The World

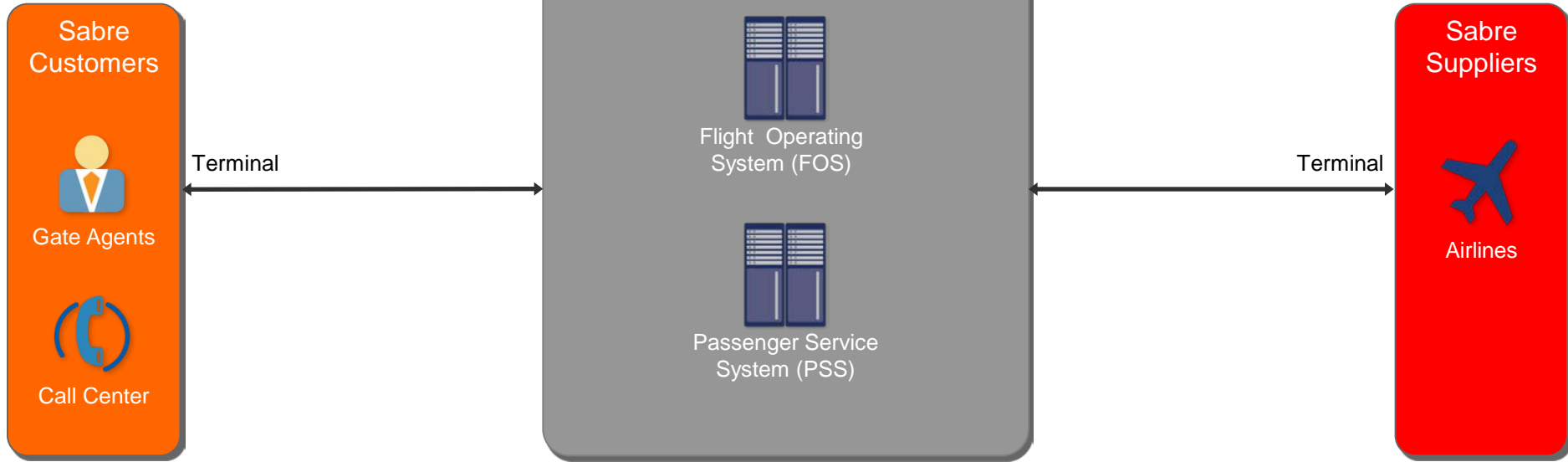
Travel Marketplace



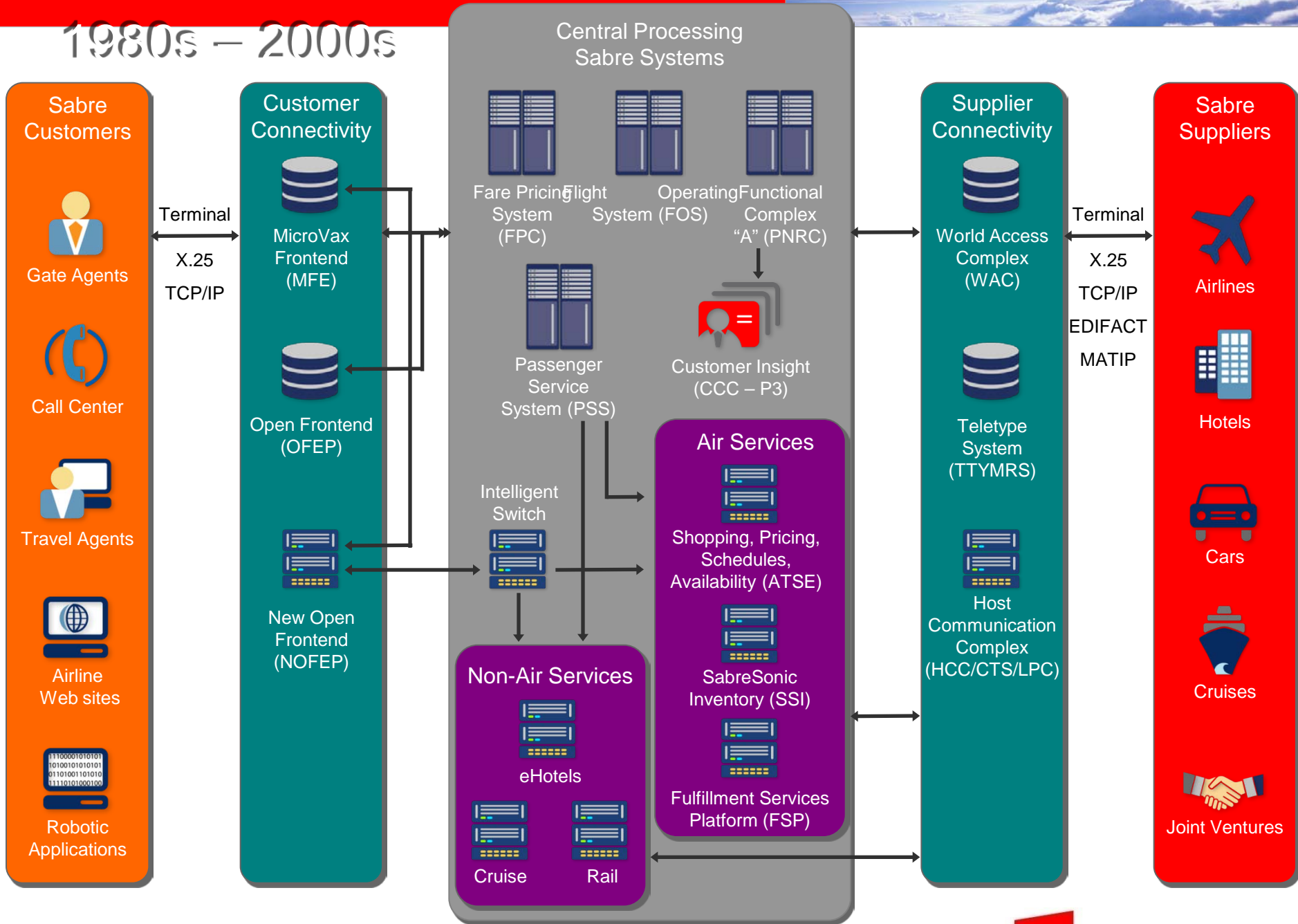
Travel Information Technology Evolution



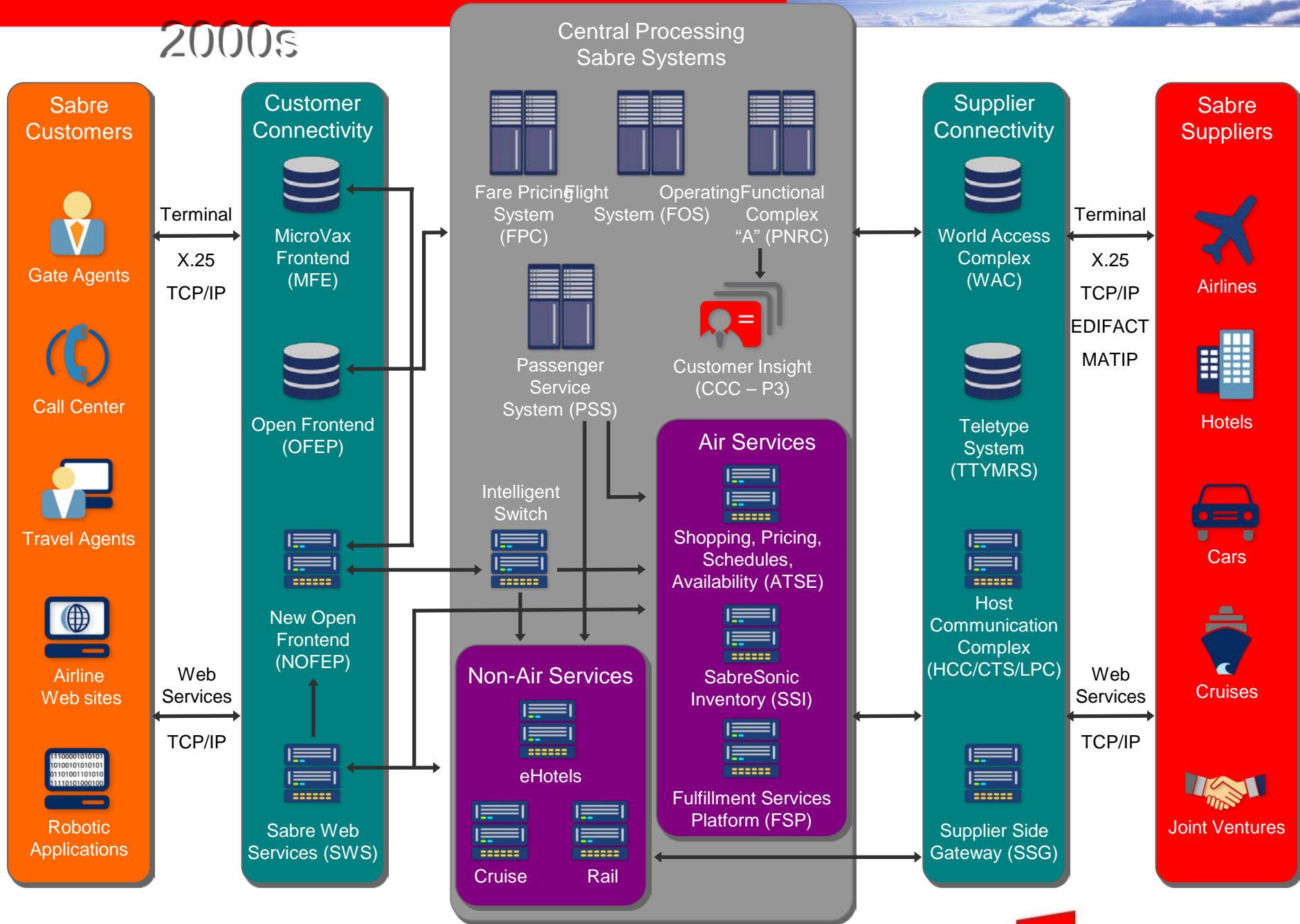
1960s – 1970s

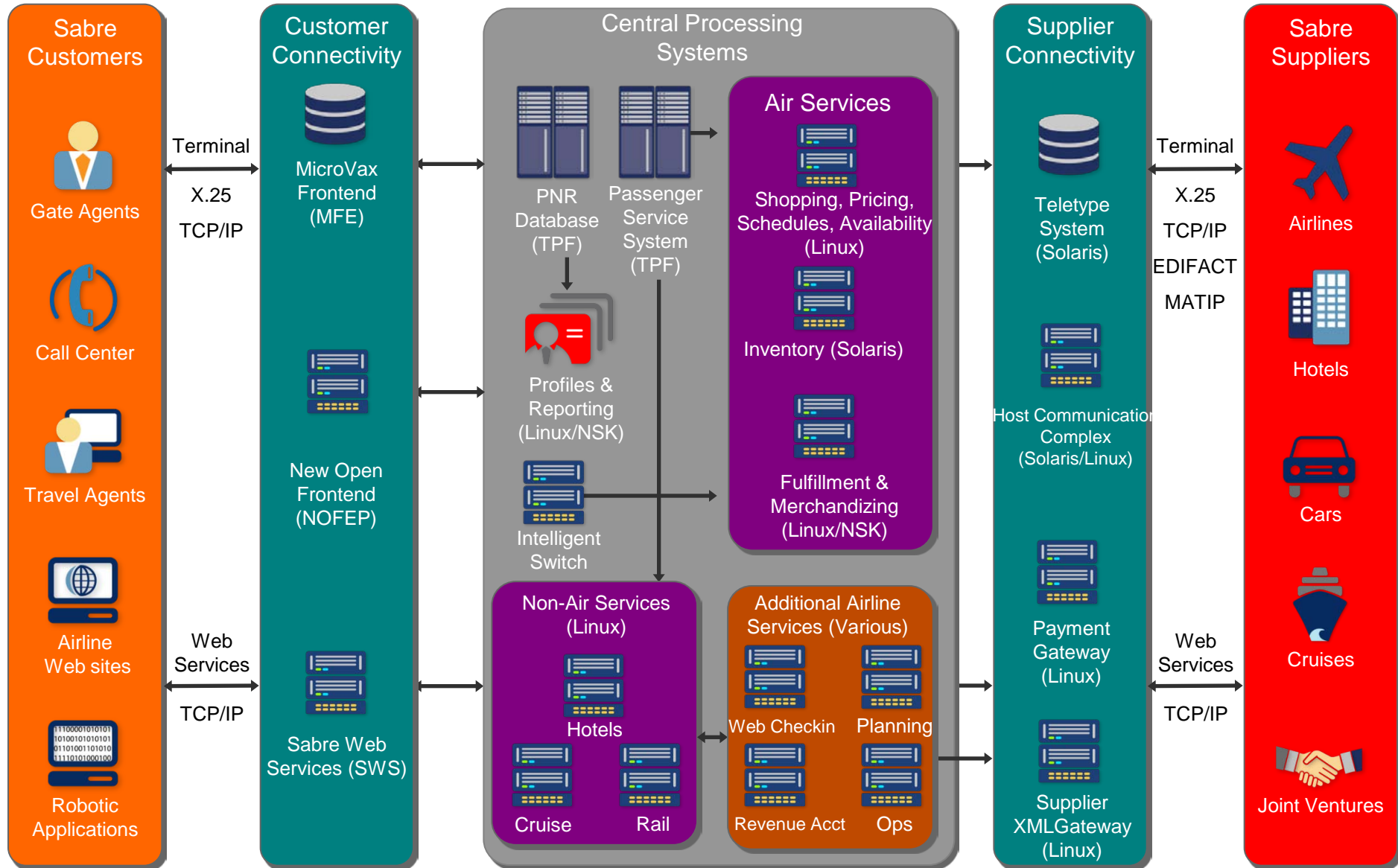


1980s – 2000s



2000s





Challenges

Decrease costs of system integration

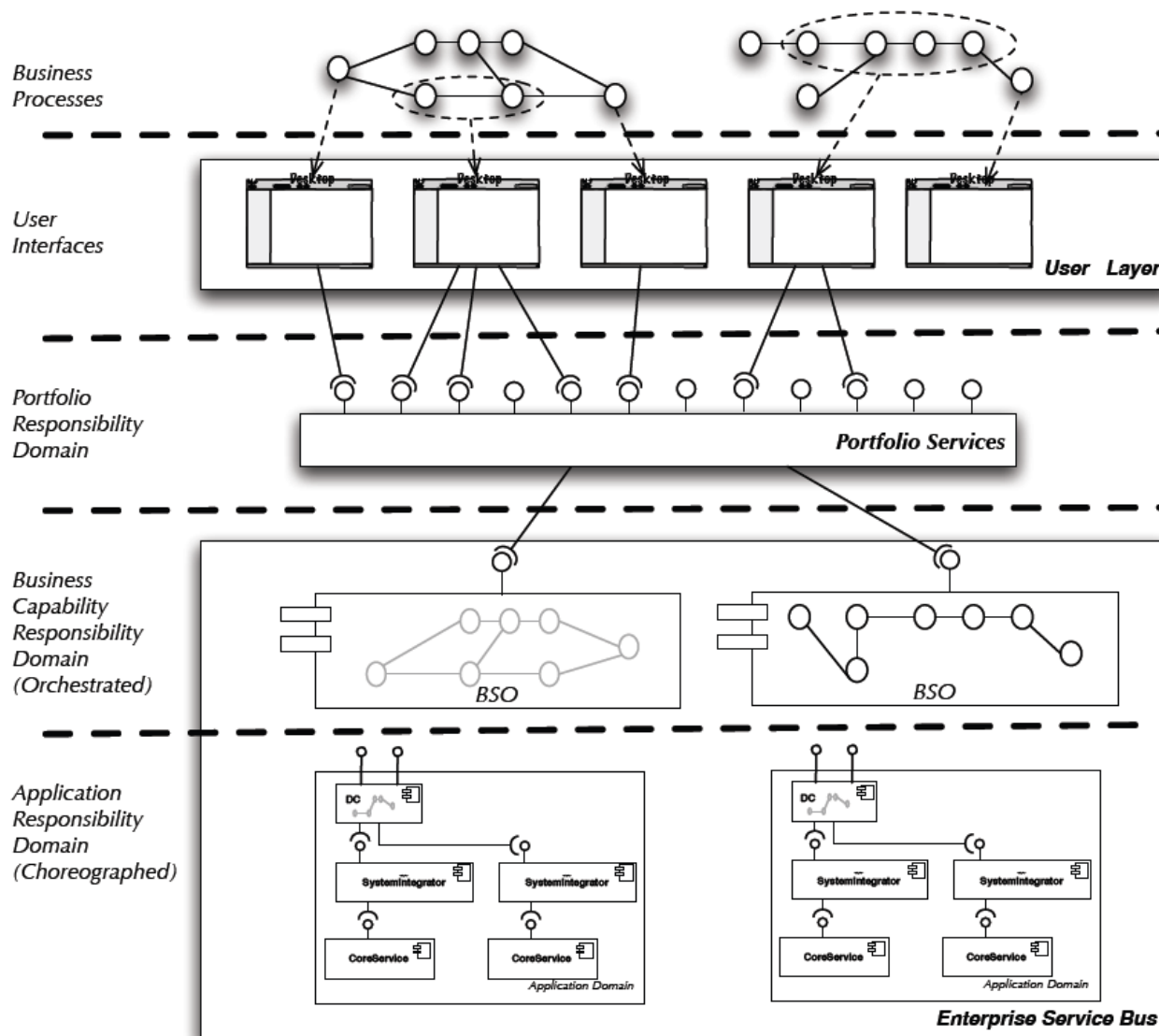
- Business logic hidden in legacy systems
- Application algorithms mixed with process flow
- Different machine, application, information architectures
- Promote reuse, reduce duplication

Decrease time to market

- Market segments need specialized user interfaces
- Customers need tailored workflows
- Separate stable business logic from changing process flow

Flexibility to adapt to changing market

Where We Are Moving



Information Architecture

- **Message oriented architecture**
- **Messages assembled from reusable type library**
- **Object types defined to meet needs of the architectural layer**

Delivery Objects

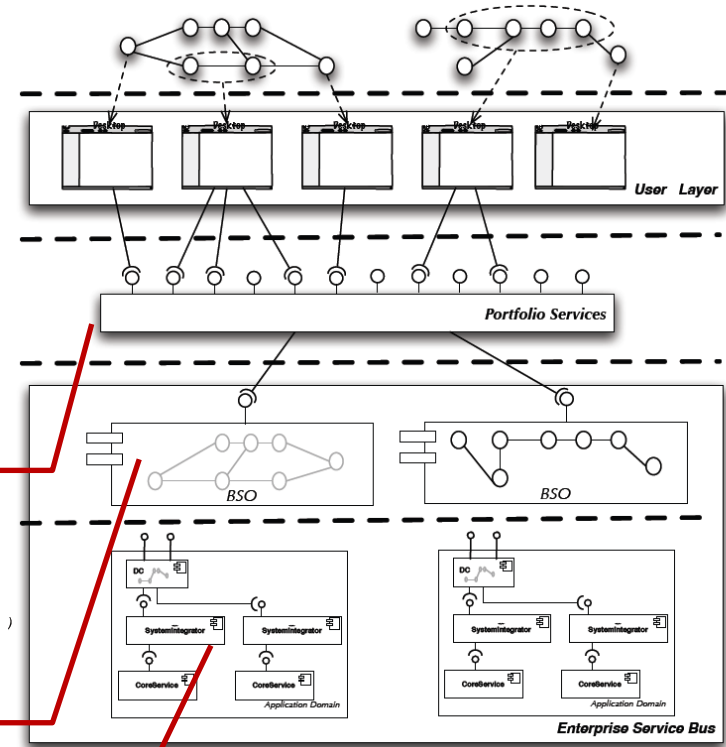
- Industry Standard –or–
- Consumer specific

Business Objects

- Data model used to drive orchestration
- Sabre standard “canonical” model

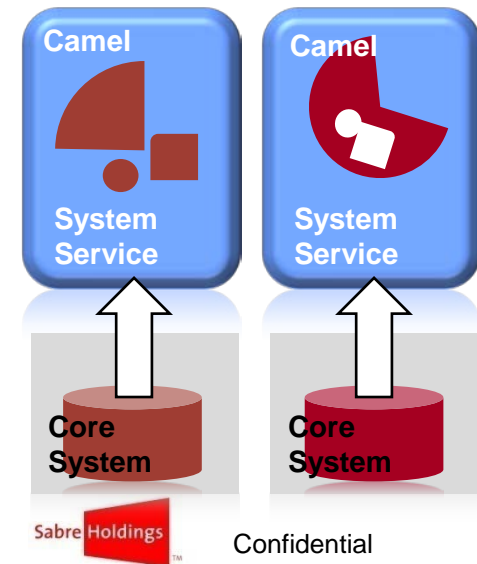
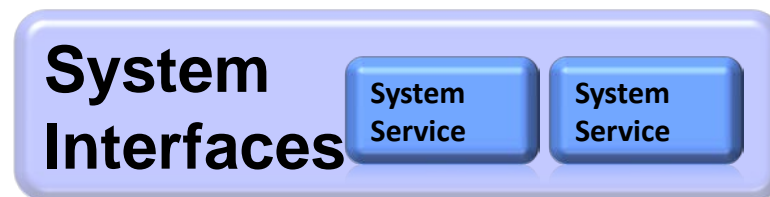
System Messages

- Data only from the system
- May not be complete



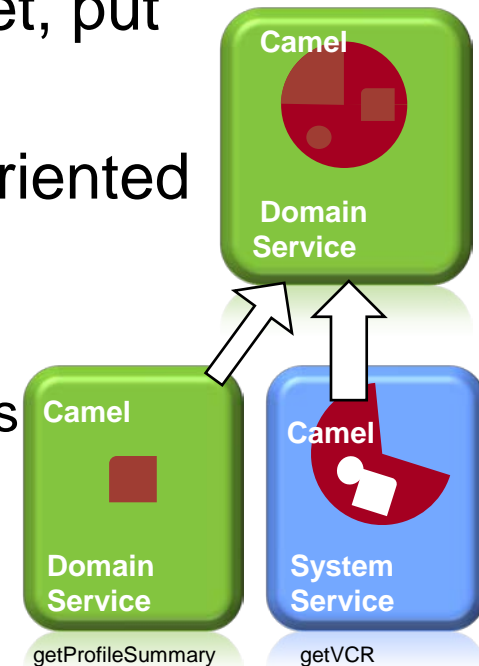
System Interfaces

- **System Interfaces expose System Services which adapt core systems to SOA environment**
 - Expose system functions
 - Communicate with MOM (or HTTP if externally deployed)
 - XML/STL Events, Requests and Responses
- **System Centric Services**
 - Responses contains only the data in the adapted system
 - May not be the complete representation of the business object
 - Does not call other services to fulfill request
 - Lowest compute cost



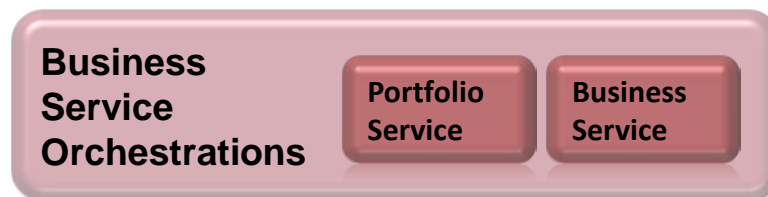
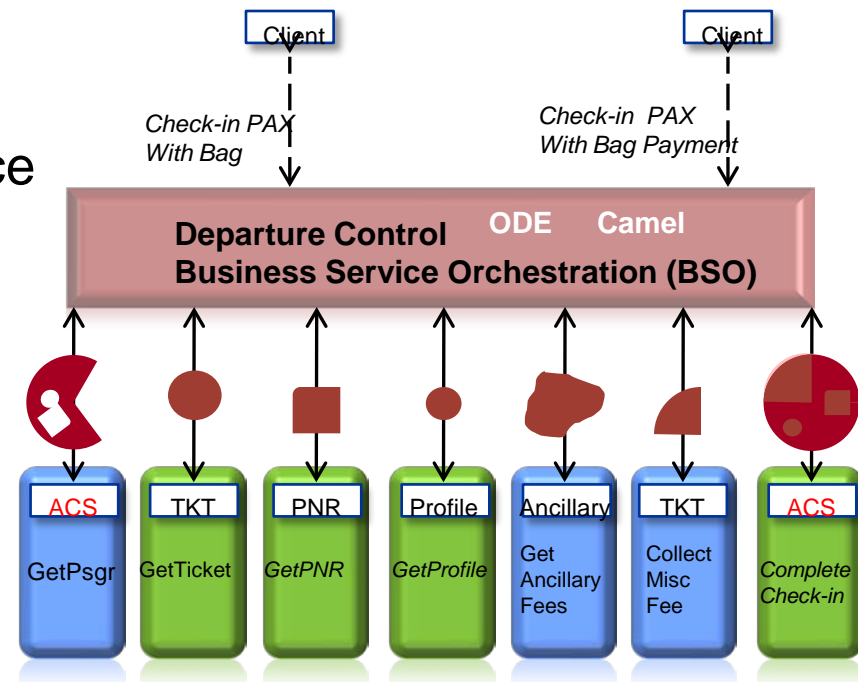
Domain Controllers

- **Domain Controllers expose Domain Services which manage Enterprise Business Objects**
 - They may use business logic to enrich data from system services
 - The operations are object focused (NOUN)
 - *REST-full* operations (post [create], get, put [update], delete)
 - Similar to DB: CRUD + Query asset oriented services
- **Domain model centric services**
 - Messages contain full canonical STL domain types



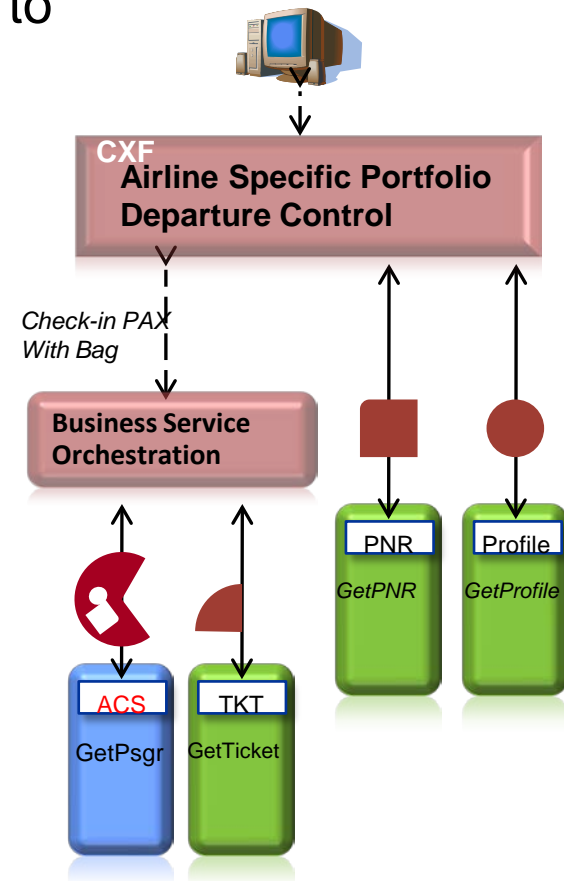
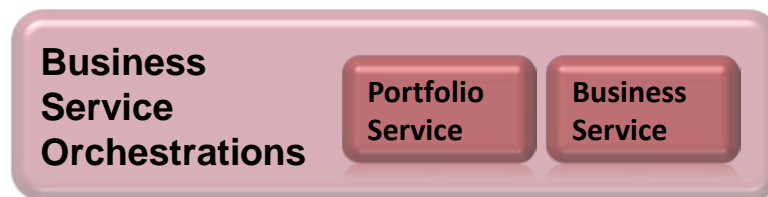
Orchestration - Business Service Orchestrations

- **Business Service Orchestrations expose Business Services which deliver business or product capabilities**
 - Capabilities are action oriented (VERB)
- **BSO Tasks and Scenarios**
 - Defined by Sabre product teams
 - Coordinate results from a sequence of service calls
 - Perform business scenarios
 - Uses Canonical-STL input and output



Orchestration - Portfolio Services

- **Business Service Orchestrations expose Portfolio Services which deliver customer-defined business capabilities**
 - Provides customized, uniform service portfolio to customers, applications or markets
- **Portfolio Services**
 - Orchestrates to meet customer process requirements
 - Normalize data (transform, filter, sort)
 - Exposes User Specified XML



Portfolio and Business Services

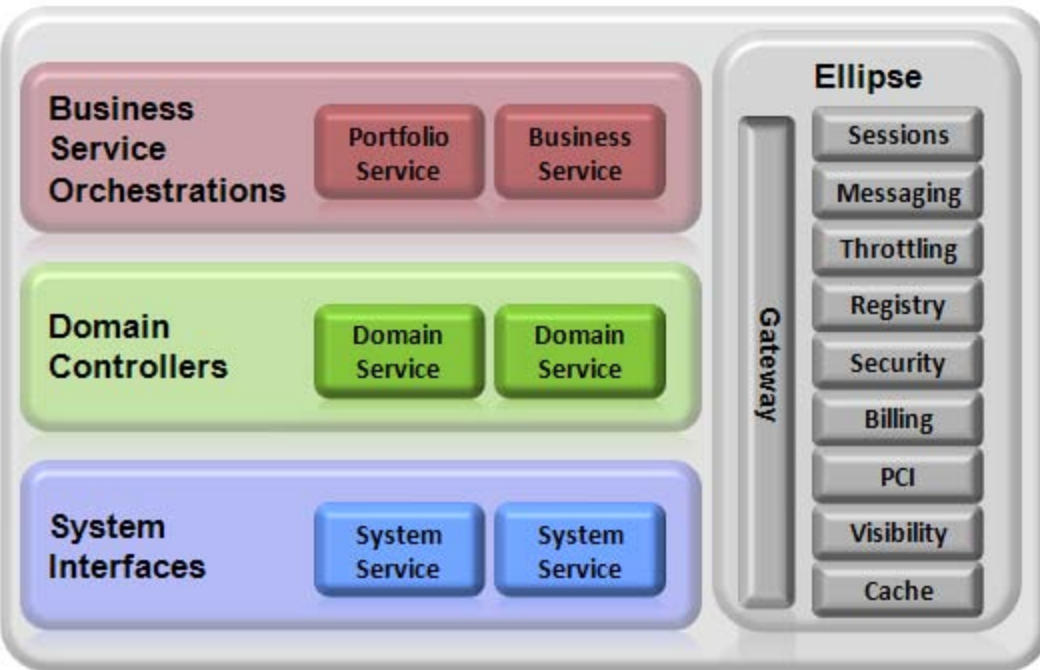
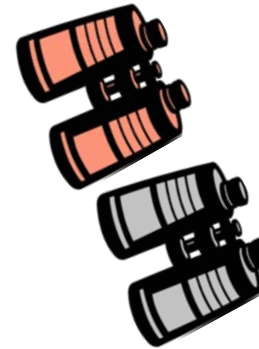
- **Business services define “The Sabre Domain”**

- Capabilities defined and delivered by Sabre systems

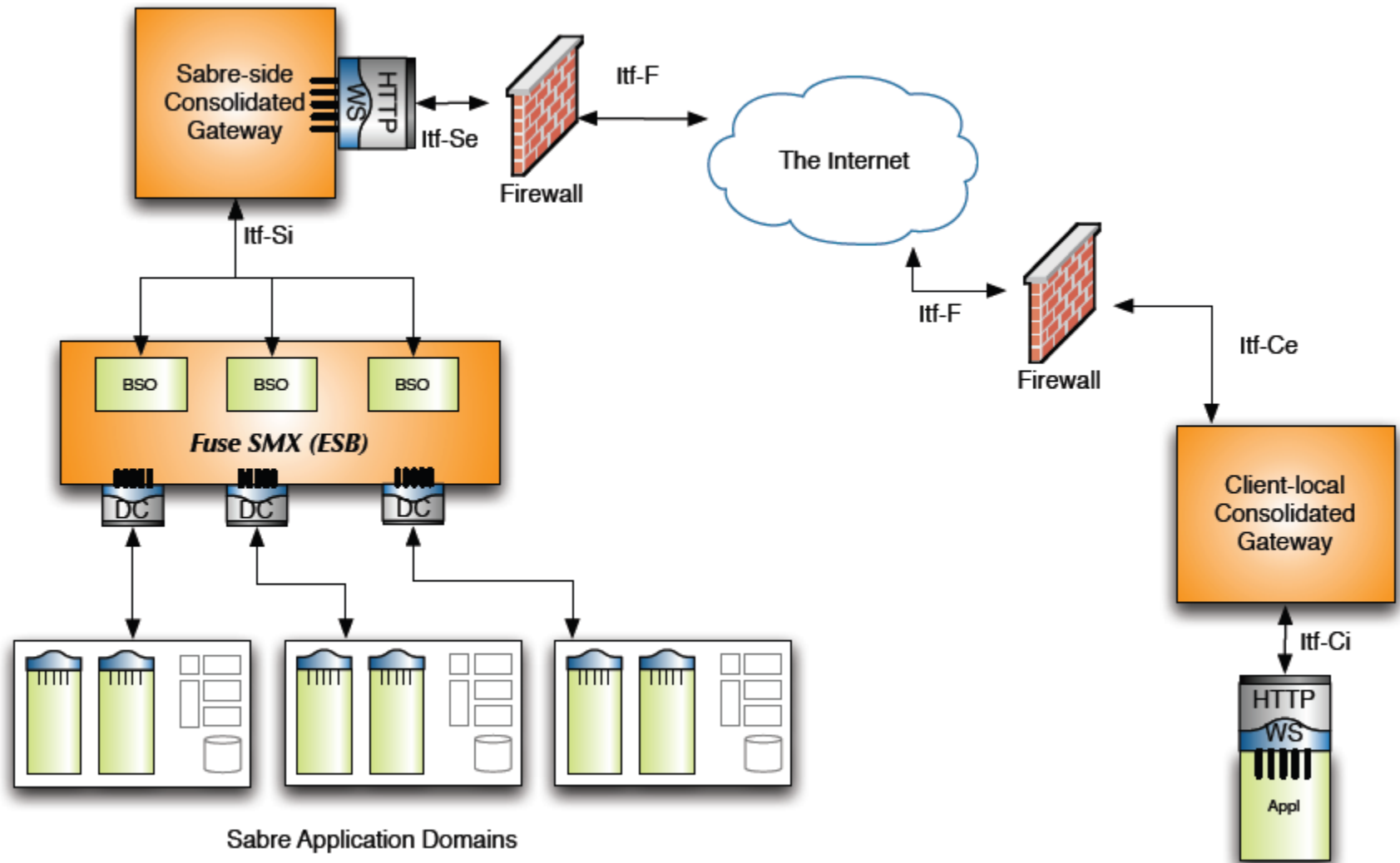


- **Portfolio services provide a customized view tailored to customer requirements**

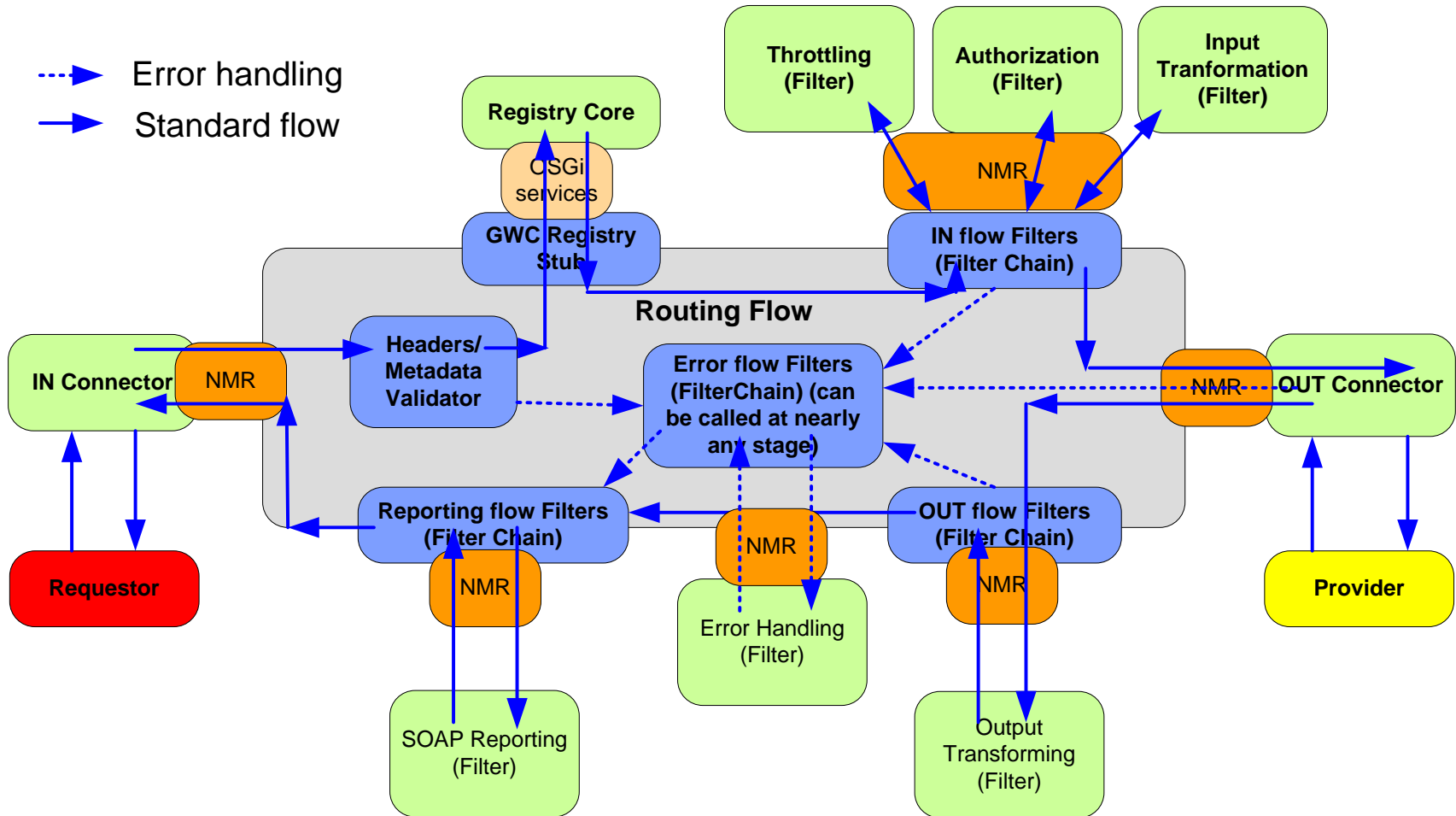
- Adapted to different processes and market traditions
- Terminology transformed to their preferred XML standards



Distributed Services



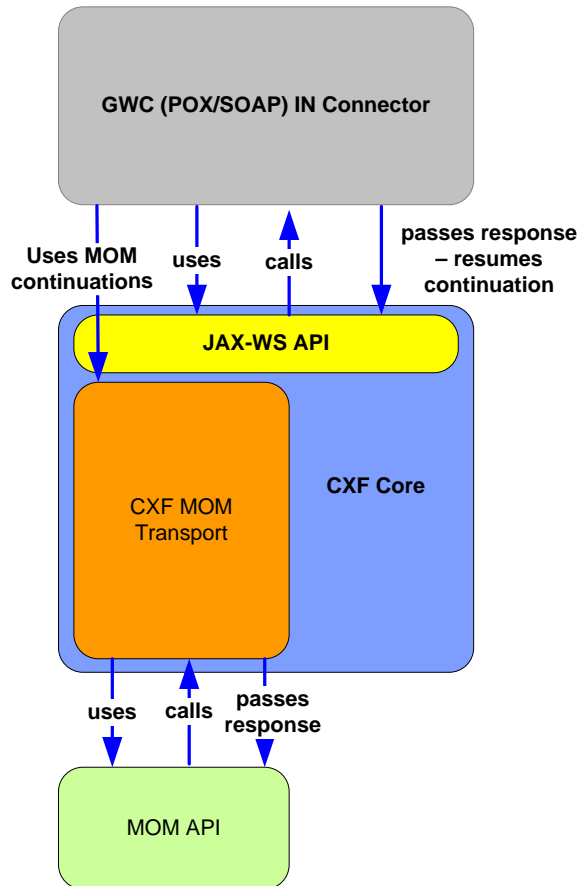
Gateway – Architectural View



Gateway - Connectors

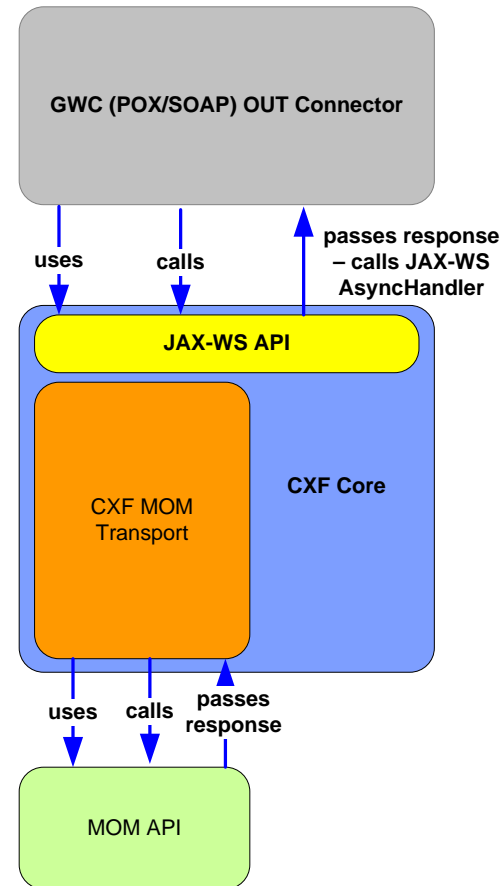
Inbound flow

MOM transport for CXF used through JAX-WS WebServiceProvider with CXF continuations



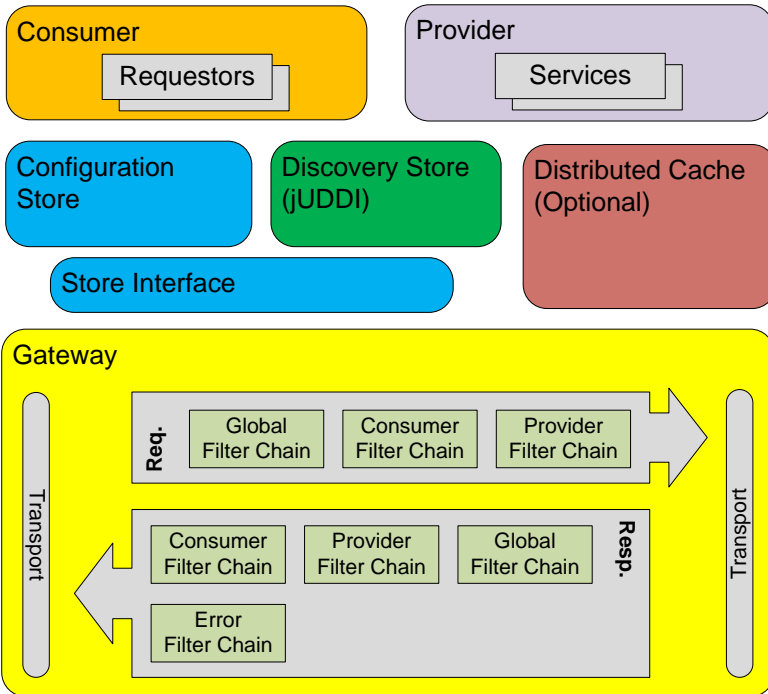
Outbound flow

MOM transport for CXF used through JAX-WS Dispatch

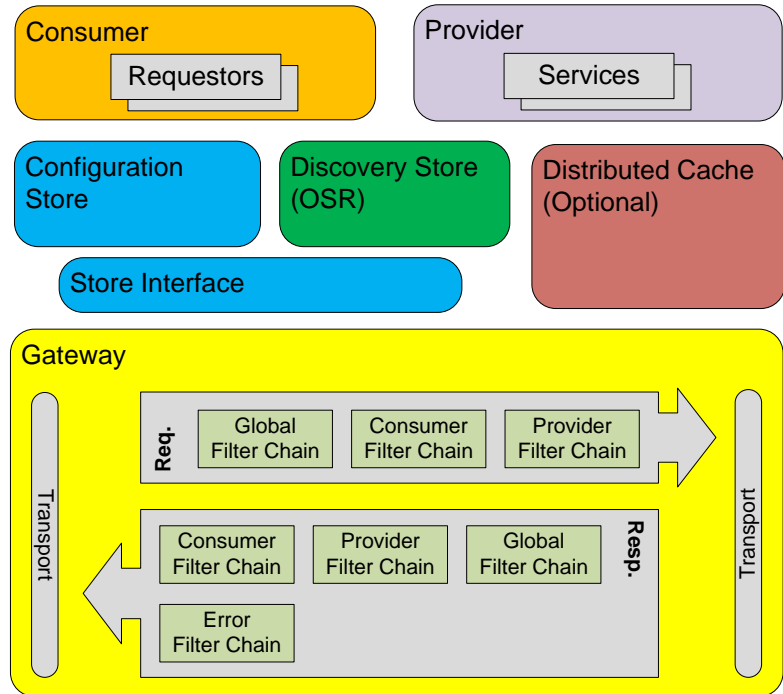


Gateway - Registry

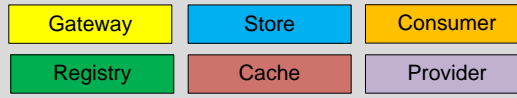
Airline/Local Deployment



Sabre Deployment



Legend



Challenges Discovered

General

- FUSE Platform evolving rapidly
- All components need hardening

SMX/OSGi

- Complexity – so many bundles, easy to get lost
- What works in flat class loader might behave differently
- Need to be able to control the order in which bundles are initialized
 - Value of start level and order of bundles helps

Challenges Discovered

Building test suite difficult

- Need to run both inside and outside container
- Pax Exam slow

CXF

- Needs to be re-factored to be OSGi friendly

Camel

- Works well, some limitations with Spring v Blueprint

Things to Think About

Monitoring

- Can't always deploy FUSE HQ in production
- End to end monitoring

Deployment

- Flexibility of OSGi deployment model v operations need to control
- Don't want Maven available in production

Questions?