



IBM SOA Executive Summit

You want to know  
how hard  
integration can  
be?

**IBM**

# Service Architecture: An Applied Business Technology

The art of innovation for business delivery

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## what is an Applied Business Technology

- It is the Method and Process for Applying Services technology to business processes, utilizing existing infrastructure and functional business processes, while transitioning to a fluid, loosely coupled, agile and adaptive business ecosystem. This applied business technology has at it CORE the on going Equilibration between the ever changing and complex demands of the business with the managed execution of these Business demands in Real Time

# what is SOA? why all the hubbub?... SOA changes the paradigm, it is

## ... a service

A self contained **repeatable business task** – e.g., check customer credit; open new account

## ... an orientation

Seeing your business as both diverse and contiguous “linked” activities; at once independent and interdependent, subject to on going reassembly and reuse

## ... an architecture

treating your technical capabilities as a seamless extension of your Business processes and activities

... and behaves with a capacity for countless **composite-applications** which in turn provide **highly scalable, re-configurable business responsiveness and agility**

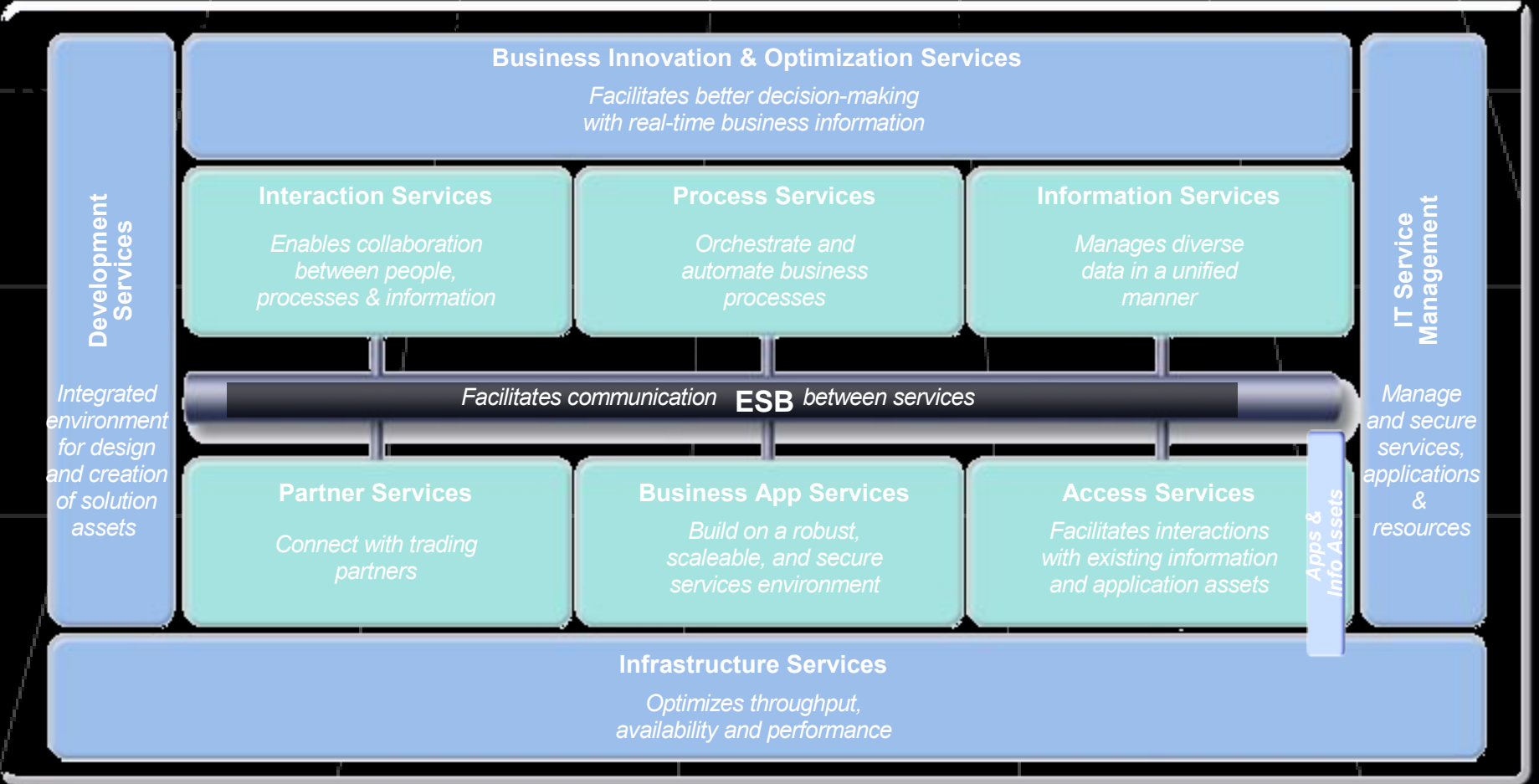


# Business Centric SOA starts with your most critical business pain

And is brought to conclusion through a business process enablement lifecycle.

- 
- Discover available service
  - Construct & Test
  - Compose
  - Integrate people
  - Integrate processes
  - Manage and integrate information
  - Introduce “a” business objective
  - Using a governance plan, harden requirements
  - Model & Simulate (test for workflow and choreography)
  - Design plan
  - Financial Transparency
  - Business / IT Alignment
  - Process Control
  - Manage applications & services
  - Manage identity & compliance
  - Monitor business metrics

# The SOA Reference Architecture provides a roadmap

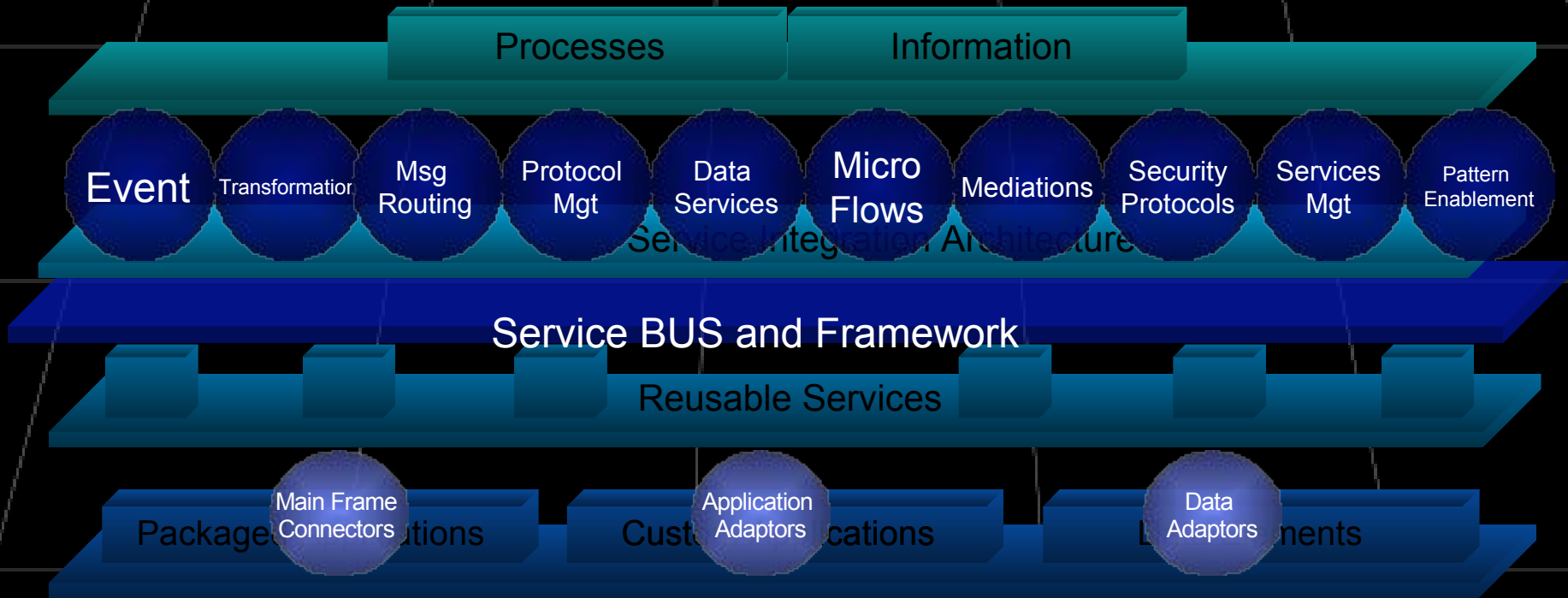


1 Creating an SOA Framework can begin in an Organizational Experience suggests that challenges or IT may obviate the need for a SOA Framework

2 A Business challenge occurs as mergers, acquisitions, changes in the business environment or new demands on products, processes or customer needs emerge. In this case, "business drivers" not "technology change, IT must the"

The final "backplane" crucial to any SOA Framework is Services Management. It is here that the Services registry, the Repository, the Patterns engine, the service templates are all tracked, managed, audited, changed, modified. Without fully integrate Services Management no approximation of an SOA will succeed.

Service-oriented Business Process connector environment will  
 exist by the end of the year. In the application, data  
 and external environments needed. These "services" are  
 being directly adapted to the services management



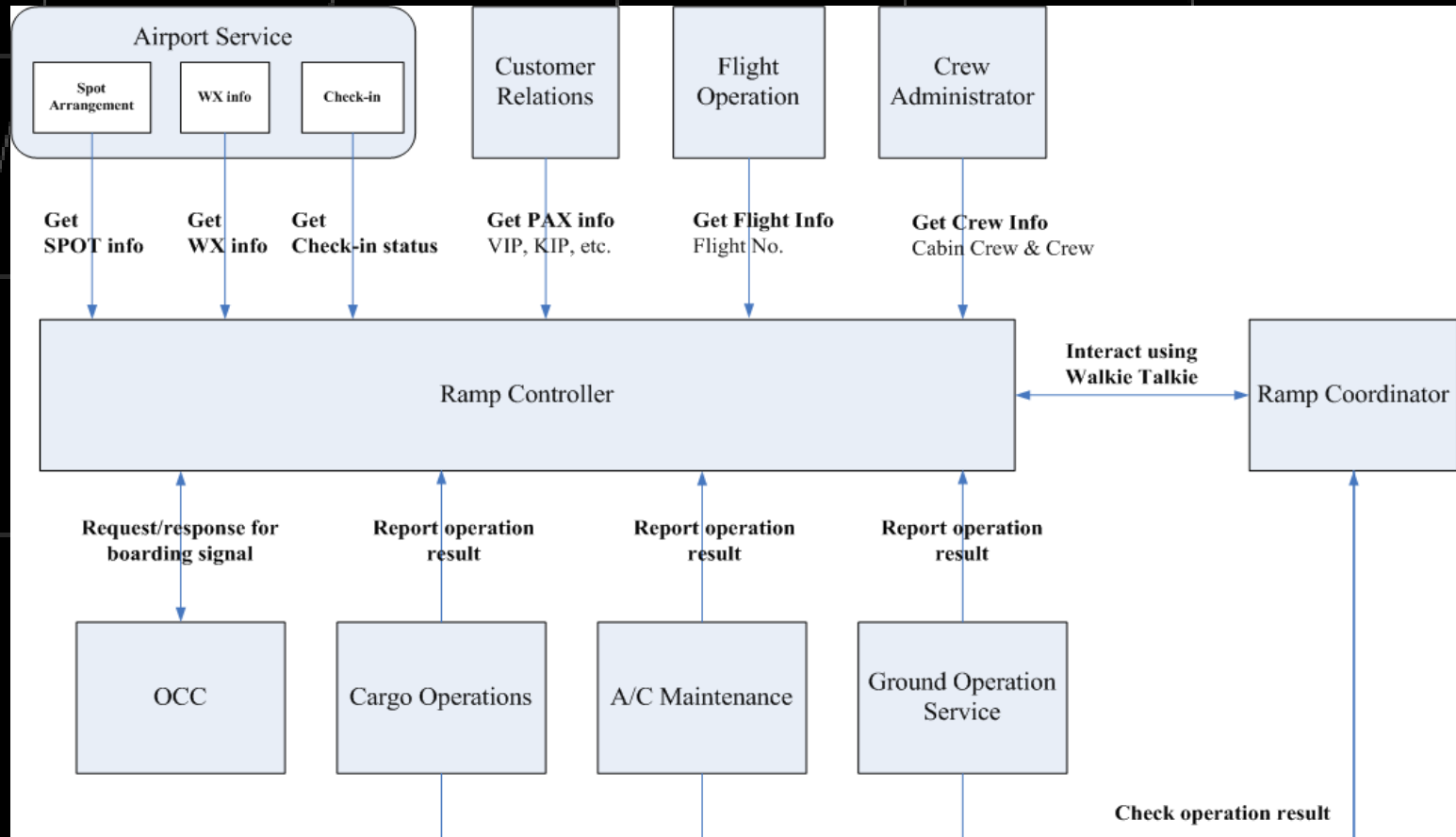


## Korea Airline Project background

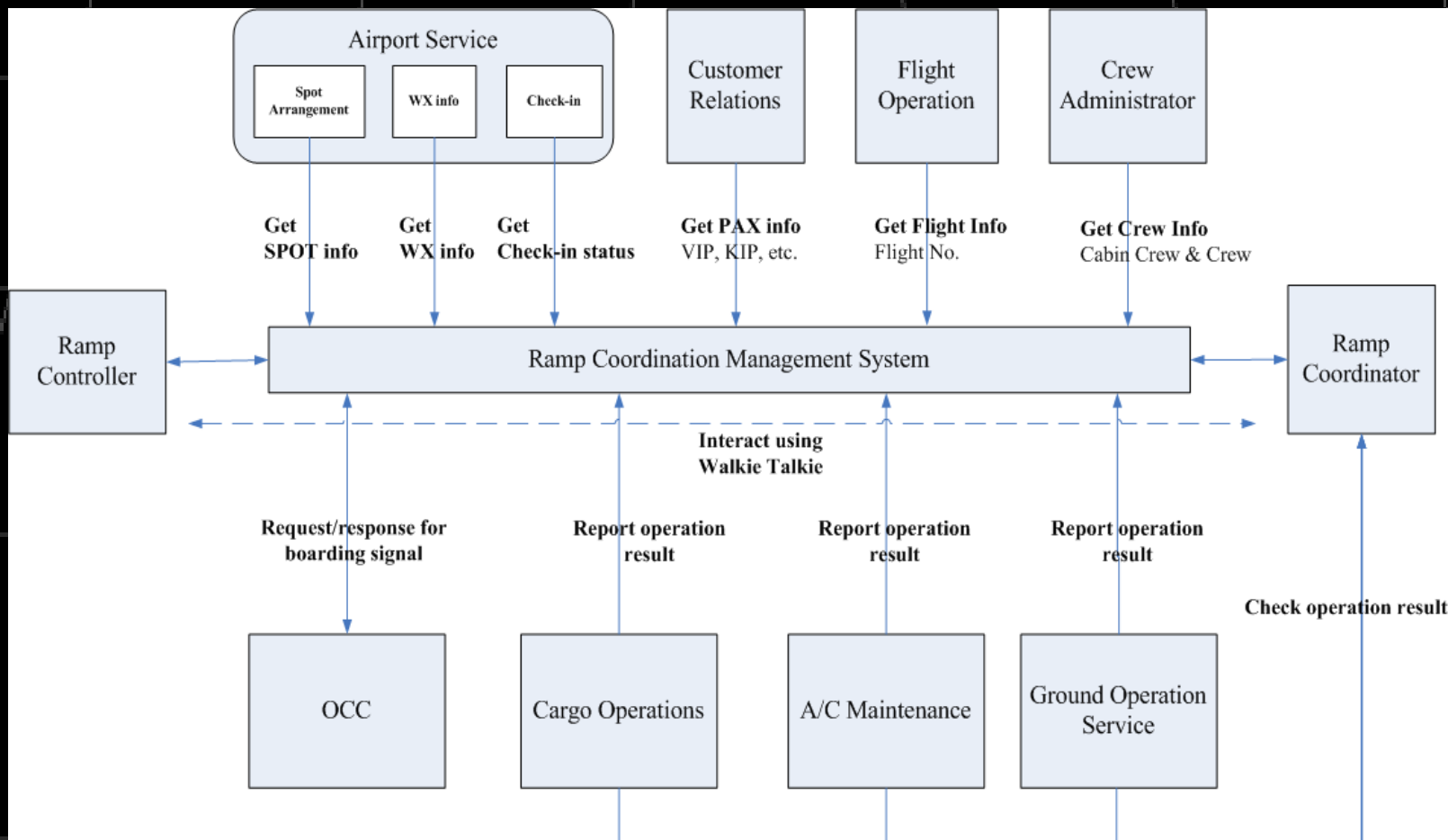
- This project was designed to demonstrate the feasibility of applying the SOA concept in the integration of a subset of the Ramp Coordination sub-processes within Flight Operations.



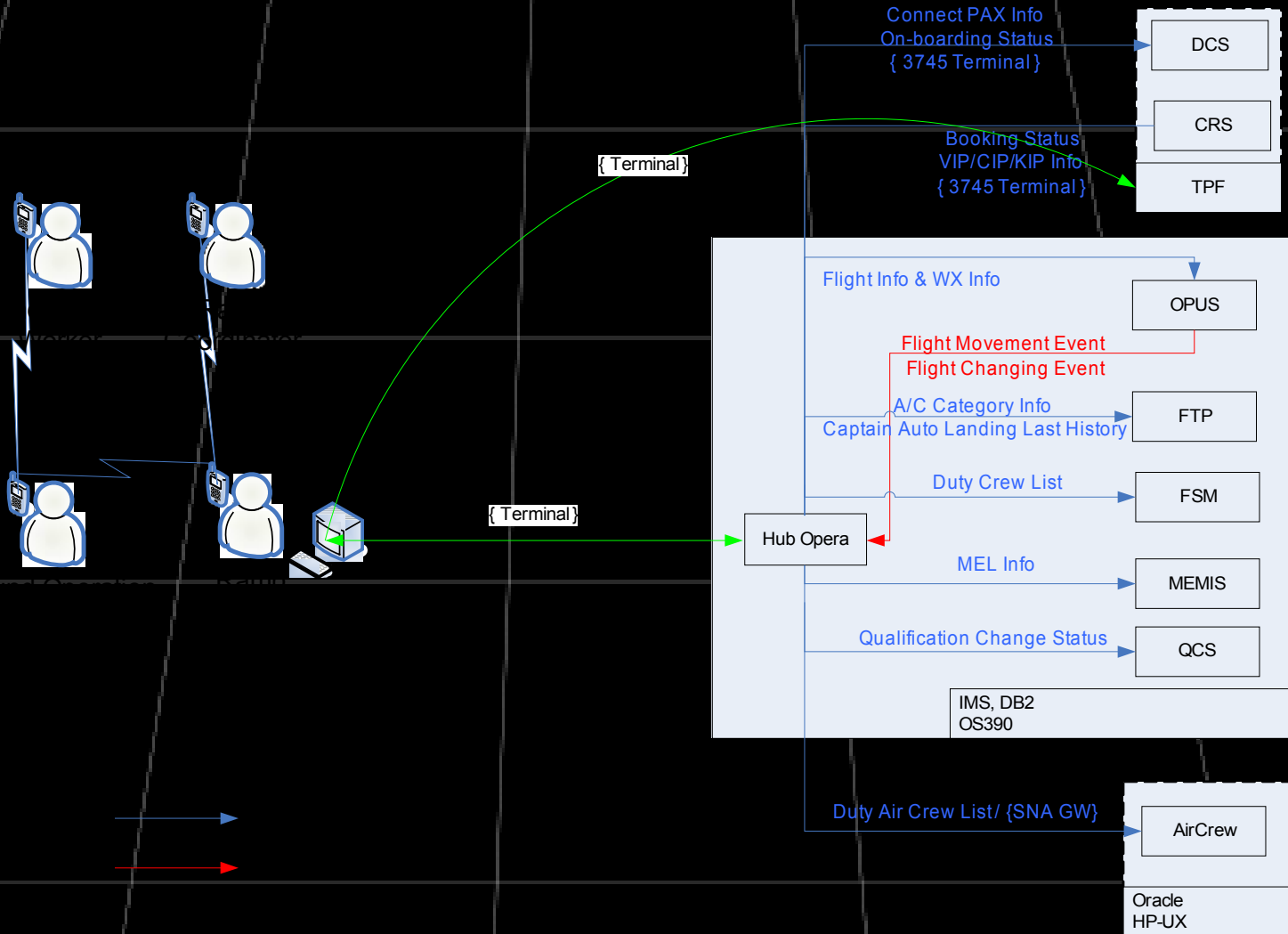
# The Business Context



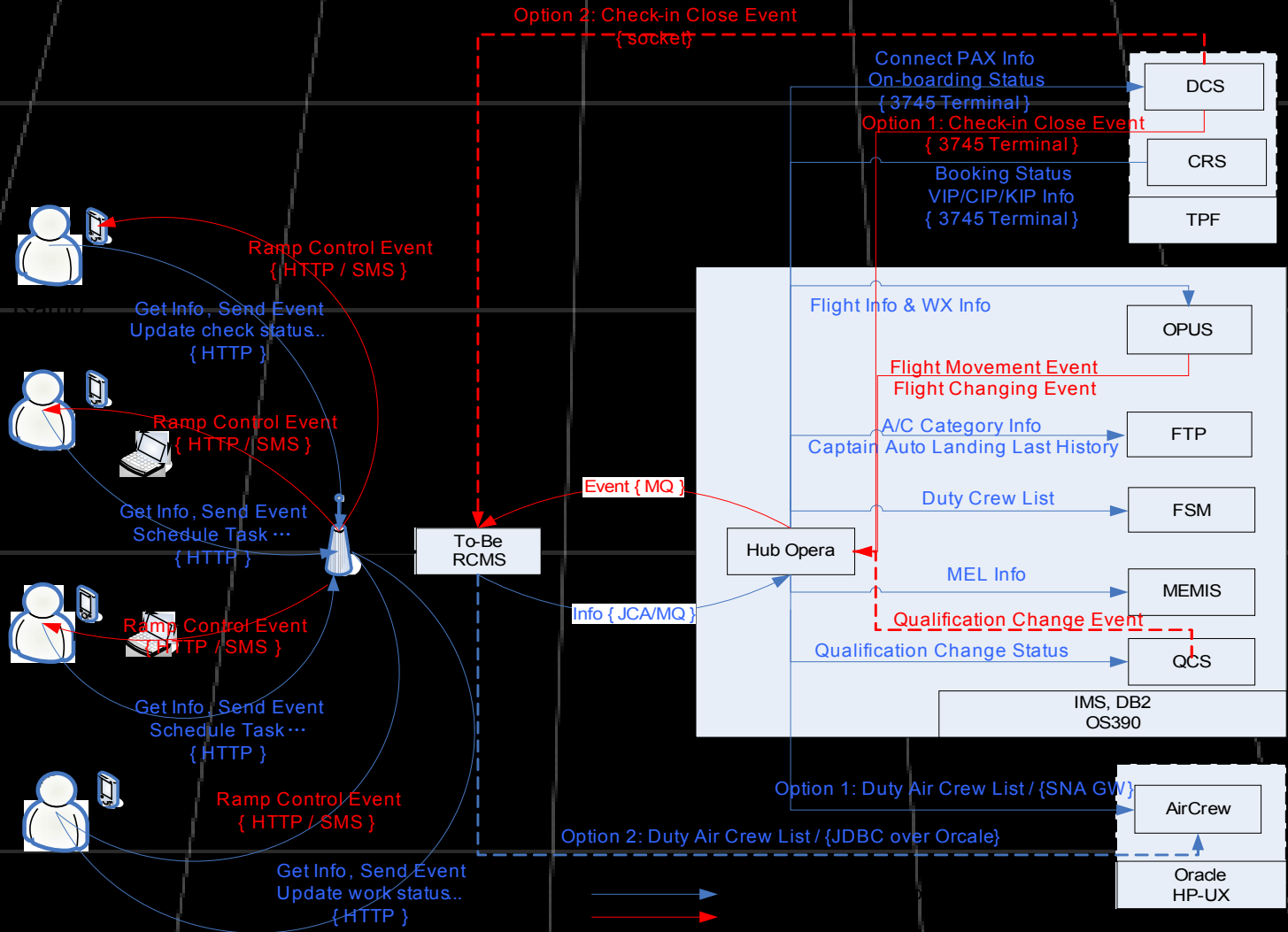
# Resultant SOA Business Context



# Existing IT Context



# Planned SOA IT Context



# Functional Requirements

- **Business**

- Develop a pilot system using SOA methodology by focusing on a selected “Ramp Coordination” process, which meets below function requirements:
  - Share the right information with ramp coordinators in a real-time way
    - RCMS\_FUN\_INFO\_001: Ramp coordinator can get flight information when he/she needs
    - ...
  - Notify ramp coordinator the events in a real-time way
    - RCMS\_FUN\_EVENT\_001: R/C gets notified the events of “check-in-close” event
    - ...

- **Integration existing mainframe application to get information**

- See the right table

| Source of Information for Customer Care | Target Application Service to be integrated  |
|---|--|
| OPUS                                    | Flight information<br>Weather information<br>Flight movement and flight change event |
| FTP                                     | A/C category information<br>Captain auto landing latest history                      |
| FSM                                     | Cabin crew list  |
| MEMIS                                   | MEL info   |
| QCS                                     | Qualification change status  |
| DCS                                     | Connect PAX information<br>On-boarding status<br>Check-in close event                |
| CRS                                     | Booking status<br>VIP/CIP/KIP information  |
| AirCrew                                 | Duty cockpit crew list   |

# Non-functional Requirements

## ■ Runtime Qualities

- Performance – not an issue per customer
  - Message payload is small – mostly are 600bytes and crew info is about 10K
  - With at most 50 concurrent users, the throughput demand is low
- Scalability – not a focus per customer
- Security – not a focus per customer
- System management – not a focus per customer

## ■ Non Runtime Qualities

- Disaster Recovery – not in scope.

## ■ Business constraints

- High-Availability – There were no specific requirements given by customer
- Volume Growth – There were no specific requirements given by customer



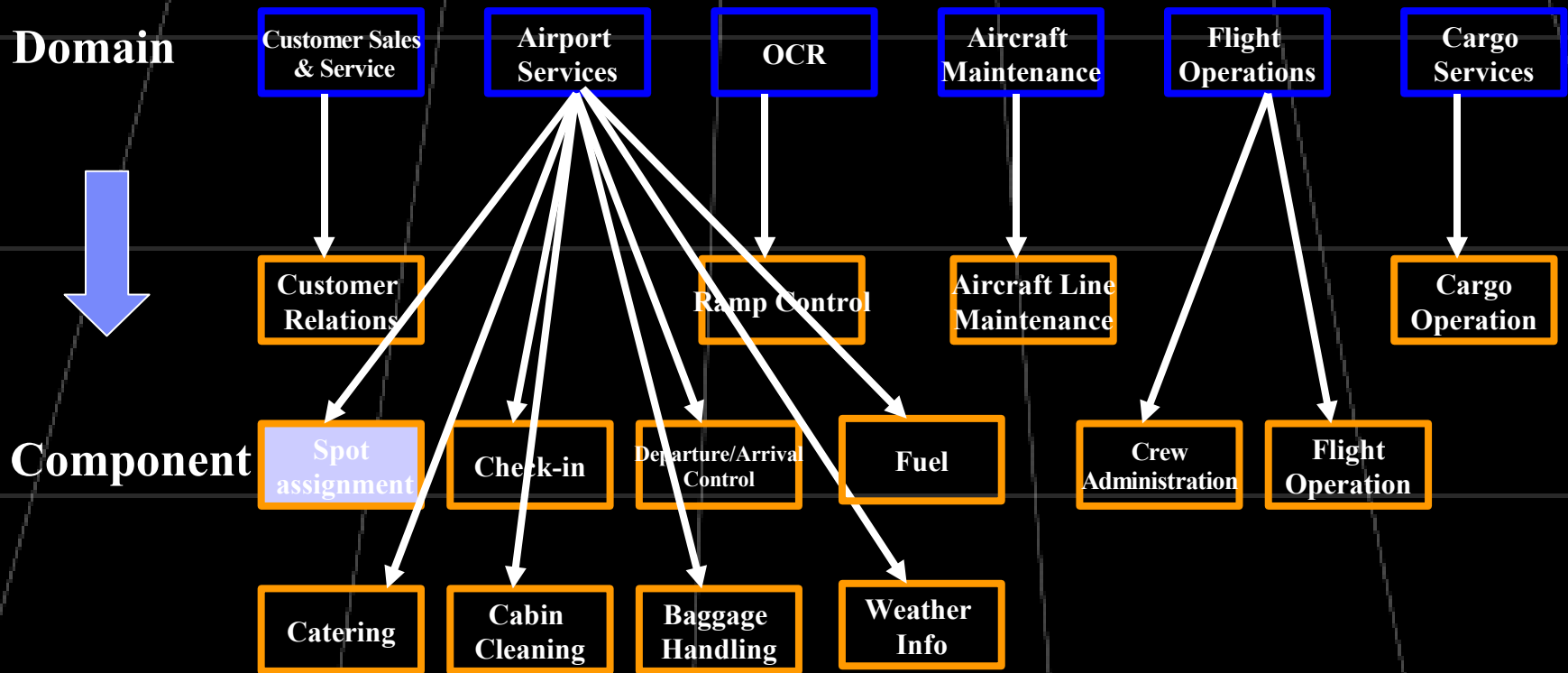
## Prototype Demo

# Mapping Business components for Ramp Coordination Perspective

| IBM     | Business Administration         | Product Management          | Customer Sales & Service       | Airport Services                 | Aircraft Maintenance                   | Flight Operations          | Business Partner Mgmt.         | Cargo Services             |
|---------|---------------------------------|-----------------------------|--------------------------------|----------------------------------|--|----------------------------|--------------------------------|----------------------------|
| Direct  | Corporate Strategy              | Brand Management            | Customer Relationship Planning | Manpower Planning                | Maintenance Strategy                   | Flight Planning            | Alliance Strategy              | Cargo Strategy             |
|         | Business Unit Planning          | Product Development*        | Distribution Strategy          | Slot Management                  | Mid - long term Maintenance Scheduling |                            | Partner Development            | Cargo Product Development  |
|         | Financial Planning              | Loyalty Program Development | Account Strategy               |                                  | Engineering Configuration              |                            | JV & Product Development       |                            |
| Control | Business Performance Mgmt       | Pricing & Revenue Mgmt      | Channel Tracking               | Manpower Scheduling & Assignment | Maintenance Planning & Scheduling      | Aircraft Assignment        | Partner Value Tracking         | Cargo Revenue Management   |
|         | Program Management & Tracking   | Market Tracking             | Sales Tracking                 | Spot Assignment                  | Manpower Planning                      | Crew Administration        | Alliance Value Tracking        | Cargo Network & Scheduling |
|         | Legal                           | Market Research Oversight   | Loyalty Program Administration | Station Operational Performance  | Technical Publications Management      | Flight Monitoring          |                                |                            |
|         | Human Resources Management      | Campaign Administration     |                                | Ramp Control                     | Ground Support Equipment Management    | Operational Performance    |                                |                            |
|         | Tax, Treasury & Risk Management |                             |                                | Station Resource Management      |  | System Resource Management |                                |                            |
| Execute | Systems*                        | Product Implementation      | Call Center Reservations       | Check-in                         | Engineering Design                     | Flight Execution           | Code share Administration      | Freight Sales              |
|         | External Relations*             | Marketing Communications    | Web Direct Reservations        | Departure Arrival Control        | Material Logistics                     | Flight Services            | Revenue Sharing Administration | Cargo Operations           |
|         | Indirect Procurement            |                             | Sales Execution                | Catering                         | Aircraft Heavy Maintenance             | Flight Reporting           |                                | Billing & Collections      |
|         | Revenue Accounting              |                             | Fulfillment/Reporting          | Cabin Cleaning                   | Aircraft Line Maintenance              |                            |                                | Cargo Accounting           |
|         | Corporate Accounting            |                             | CVA Administration             | Planeside Services               | Component Repair & Overhaul            |                            |                                | Customer Service           |
|         | Corporate Communications        |                             | Customer Relations             | Baggage Handling                 | Engine Repair & Overhaul               |                            |                                |                            |
|         |                                 |                             |                                | Lounge Services                  |  |                            |                                |                            |



# From Business Domain to Ramp Coordination Business Components



# Typical Business Process for Ramp Coordination

0 Ramp Coordination

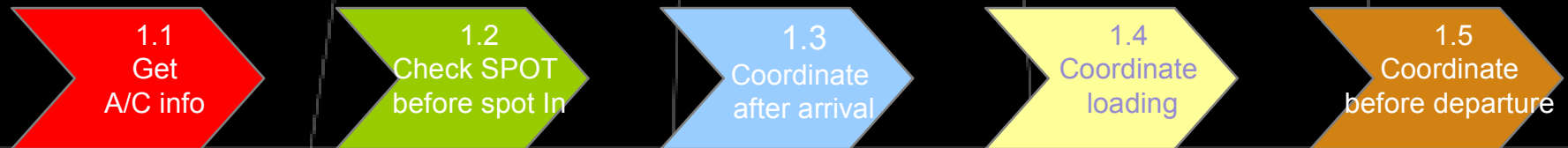
## Departure Only



## Arrival Only

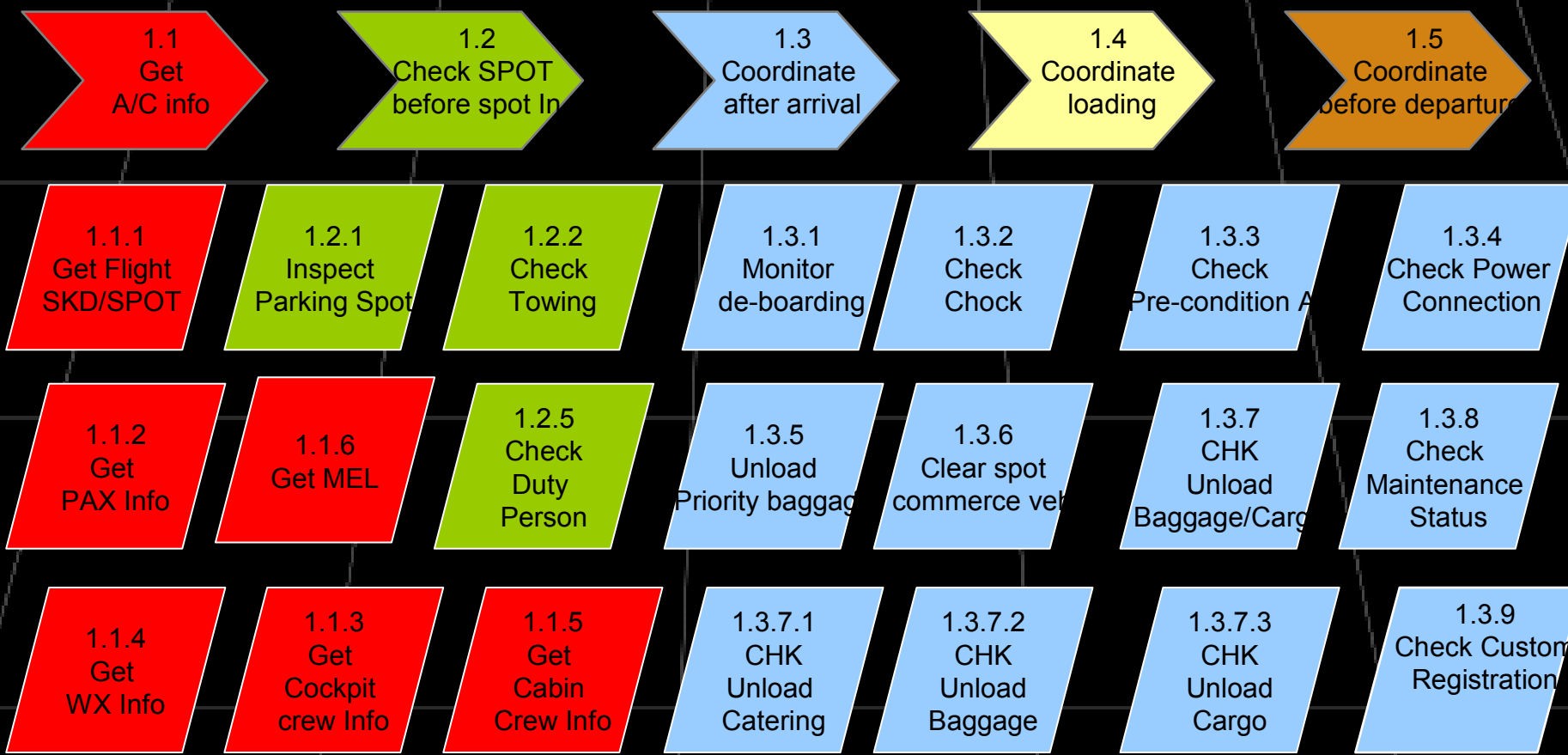


## Short Turn Around



# Ramp Coordination – Short Turn Around

**0 Ramp Coordination**



# Coordinate Loading

0 Ramp Coordination

1.1  
Get  
A/C info

1.2  
Check SPOT  
before spot In

1.3  
Coordinate  
after arrival

1.4  
Coordinate  
loading

1.5  
Coordinate  
before departure

1.4.1  
Check  
G.S.E.

1.4.2  
Check ULD  
Safe

1.4.3  
Check  
Baggage loading

1.4.4  
Check  
Cabin Cleaning

1.4.5  
Check  
Catering

1.4.6  
Check  
Fueling

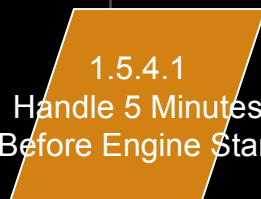
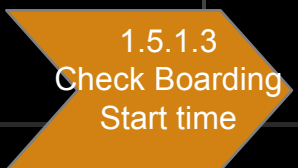
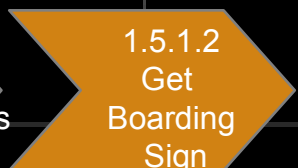
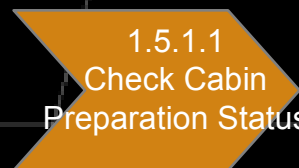
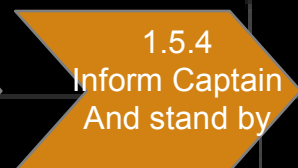
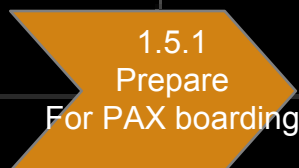
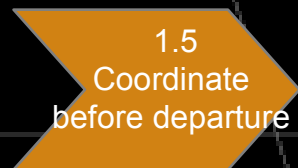
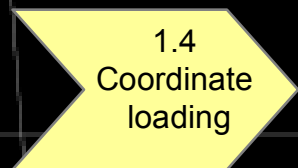
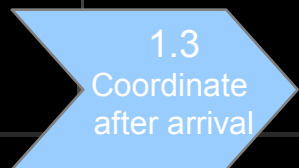
1.4.7  
Check  
Crew Show U

1.4.8  
Check  
Maintenance

1.4.9  
CHK  
Cargo loading

1.4.10  
CHK  
Cargo safety

# Coordinate Before Departure



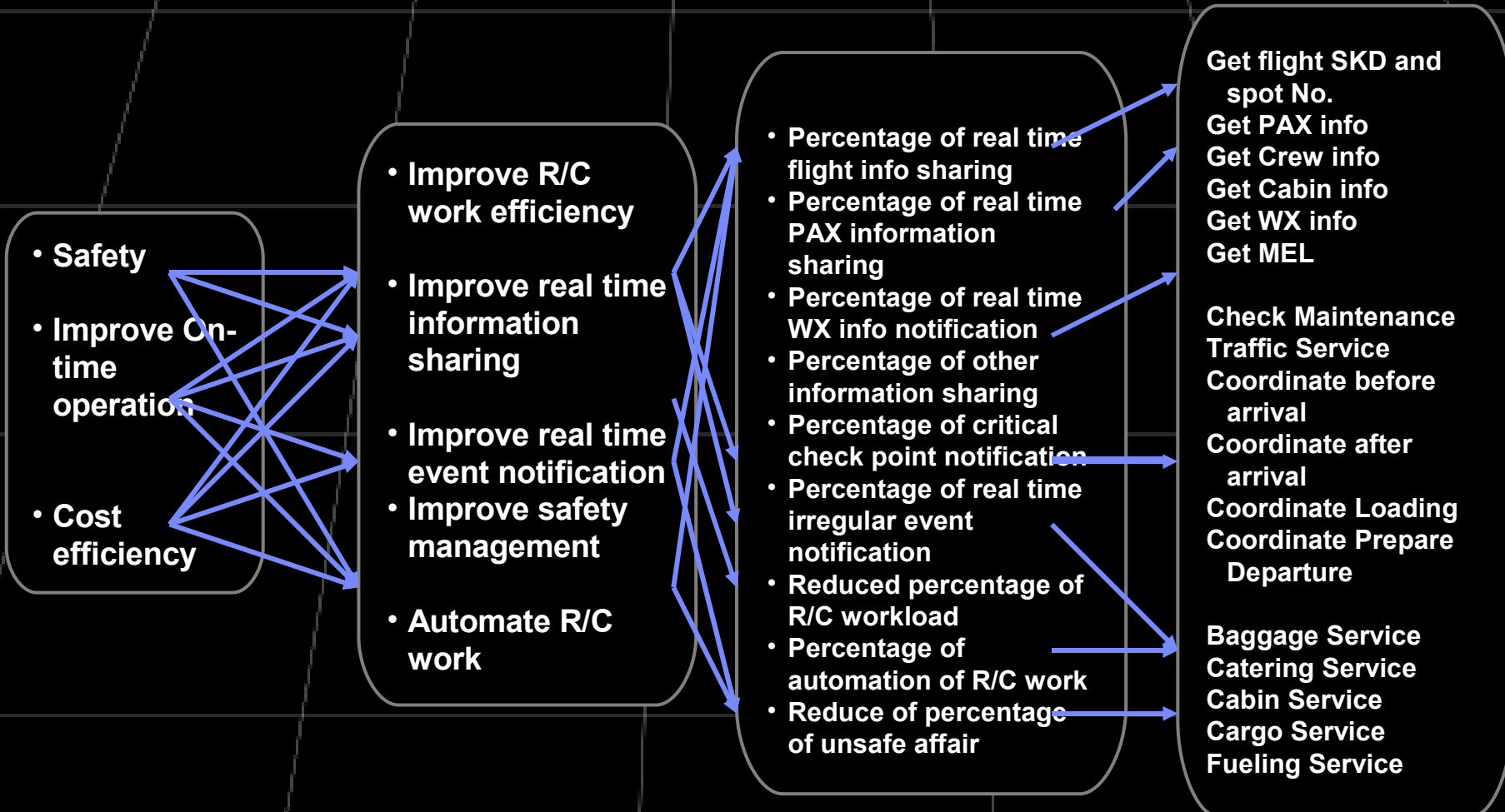
# Align Service With Business Goals

## Business Goal

## Sub Goals

## Key performance indicator

## Related Services



# Service Portfolio

## 1.1 Get Flight Info

- 1.1.1 Get Flight SKD and spot No.
- 1.1.2 Get PAX info
- 1.1.3 Get WX info
- 1.1.4 Get Crew info
- 1.1.5 Get Cabin info
- 1.1.6 Get MEL

## 1.2 Check SPOT before spot In

- 1.2.1 Inspect parking spot
- 1.2.2 Check tow-in
- 1.2.4 Check duty person

## 1.3 Coordinate after arrival

- 1.3.1 Monitor de-boarding
- 1.3.2 Check chock status
- 1.3.3 Check pre-conditioned air
- 1.3.4 Check power connection
- 1.3.5 Monitor priority baggage unloading
- 1.3.6 Clear spot for commerce vehicle
- 1.3.7 Monitor Unloading
  - 1.3.7.1 CHK Unload Catering
  - 1.3.7.2 Monitor baggage unloading
  - 1.3.7.3 Monitor cargo unloading
- 1.3.8 Check A/C maintain status
- 1.3.9 Check Custom Registration

## 1.4 Coordinate Loading

- 1.4.1 Check Loading equipment safety
- 1.4.2 Check ULD Safety
- 1.4.3 Check Loading baggage
- 1.4.6 Check Fueling
- 1.4.5 Check Catering
- 1.4.4 Check Cabin Cleaning
- 1.4.7 Check Crew Show Up
- 1.4.8 Check Maintenance
- 1.4.9 CHK Cargo loading
- 1.4.10 CHK Cargo Safety

## 1.5 Coordinate Prepare Departure

- 1.5.1 Check before PAX boarding
  - 1.5.1.1 Check Cabin Preparation Status
  - 1.5.1.2 Get Boarding Sign
  - 1.5.1.3 Check Boarding Start time
  - 1.5.1.4 Notify Delay
  - 1.5.1.5 Check Check-in Status
- 1.5.2 Monitor PAX Boarding
- 1.5.3 Check Final Departure
- 1.5.4 Inform Captain And stand by
  - 1.5.4.1 Prepare for engine start
  - 1.5.4.2 Check Delivering DOCs
- 1.5.5 CHK Door Close
- 1.5.6 Monitor Push Back Event

# Service Hierarchy

## Flight Operation

- 1.1.1 Get flight SKD and spot No.

## Customer Relations

- 1.1.2 Get PAX info

## Crew Administration

- 1.1.4 Get Crew info
- 1.1.5 Get Cabin info

## Weather Info Service

- 1.1.3 Get WX info

## Maintenance department

- 1.1.6 Get MEL
- 1.3.8 Check Maintenance
  - 1.3.8 Check A/C maintain status
  - 1.4.8 Check Maintenance

## Departure/Arrival Control

- 1.5.1.2 Traffic Service
  - 1.5.1.2 Get Boarding Sign
  - 1.5.1.4 Notify Delay
  - 1.5.1.5 Check Check-in Status
  - 1.5.4.2 Deliver DOCs

## Ramp Control

### •1.2 Coordinate before arrival

- 1.2.1 Inspect parking spot
- 1.2.2 Check tow-in
- 1.2.4 Check location of duty person

### •1.3 Coordinate after arrival

- 1.3.1 Check location of duty person
- 1.3.2 Check chock status
- 1.3.3 Check pre-conditioned air
- 1.3.4 Check power connect
- 1.3.5 Clear spot for commerce vehicle
- 1.3.7 Monitor PAX/Crew de-boarding
  - 1.3.7.1 monitor PAX de-boarding
  - 1.3.7.2 monitor Crew de-boarding

### •1.4 Coordinate Loading

- 1.4.1 Check Loading equipment safety
- 1.4.2 Check ULD Safety
- 1.4.7 Check Crew Show Up

### •1.5 Coordinate Prepare Departure

- 1.5.1 Check before PAX boarding
  - 1.5.1.2 Get Boarding Sign



# Service Hierarchy (Continue)

## Ramp Control (Continue)

- 1.5.2 Monitor PAX Boarding
- 1.5.3 Check Final Departure
- 1.5.4 Prepare for engine start
- 1.5.5 CHK Door Close
- 1.5.6 Monitor Push Back Event

## Ground Operation

- **1.3.7 Baggage Service**
  - 1.3.7.1 Monitor baggage unloading
  - 1.4.3 Check loading baggage
- **1.3.9 Catering Service**
  - 1.3.9 Monitor catering unloading
  - 1.4.5 Check Catering
- **1.4.4 Cabin Service**
  - 1.4.4 Check Cabin Cleaning
  - 1.5.1.1 Check Cabin Preparation Status

## Ground Operation (Continue)

- **1.4.9 Cargo Service**
  - 1.3.7.2 Monitor cargo unloading
  - 1.4.9 CHK Cargo loading
  - 1.4.10 CHK Cargo Safety
- **1.4.6 Fueling Service**
  - 1.3.9 Check Custom Registration
  - 1.4.6 Check Fueling

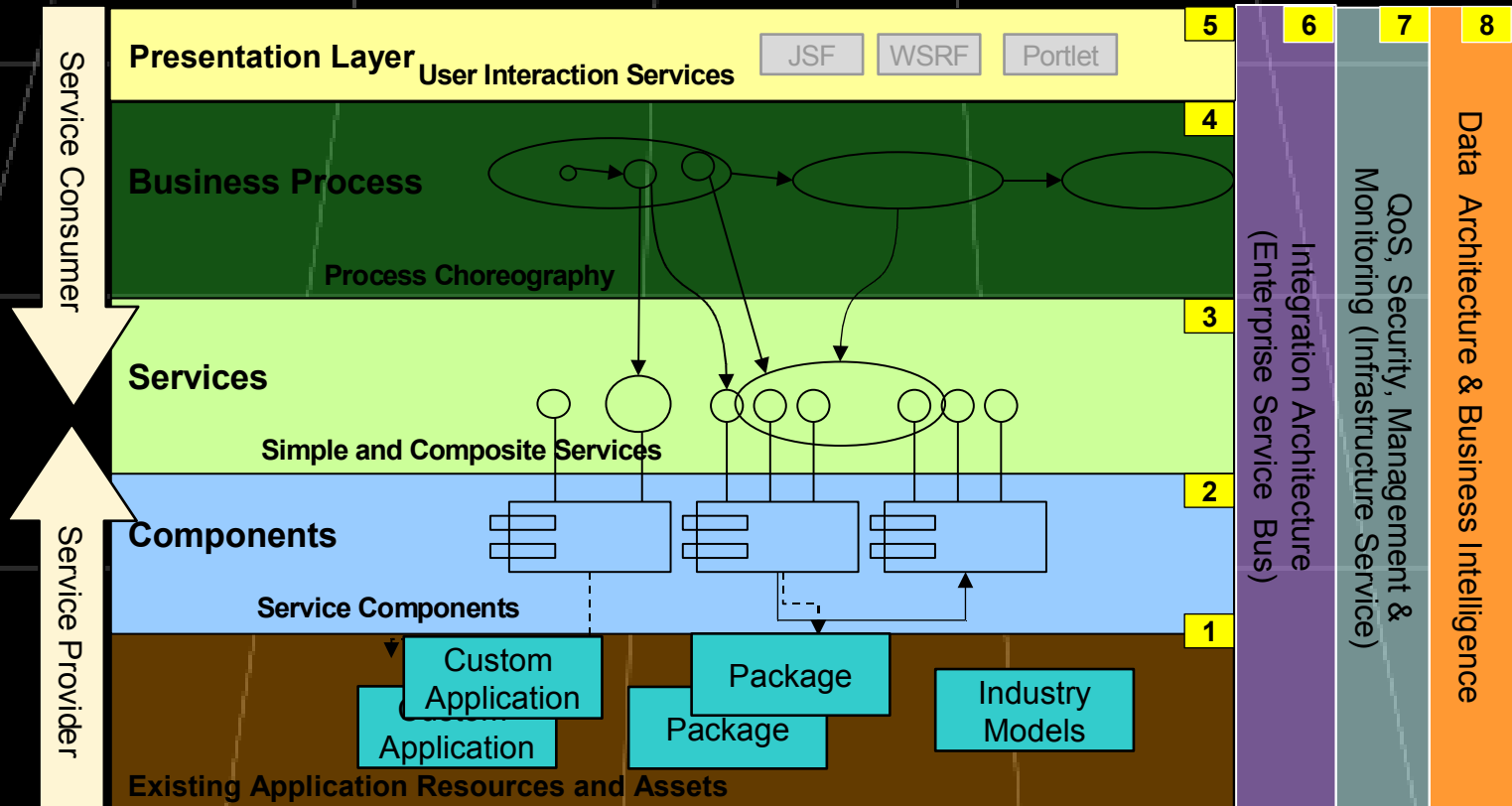
# Candidate Components to Implement Services

- UI components
- Common business objects and data transformation services
- Ramp Coordinator Activity Management (Note: for major rules)
  - Activity state persistence
- Ramp Coordinator Flight assignment (Note: fake code)
- Meta-data management
  - Business rules for state machine
  - Other configuration data
- Infrastructure components like ESB for messaging and event pub/sub, adapters and connectors for EIS applications running on TPF, IMS and HP\_UX
  - Adapters (and connectors) to connect existing EIS application and resources
- User management (Note: fake code for authorization)

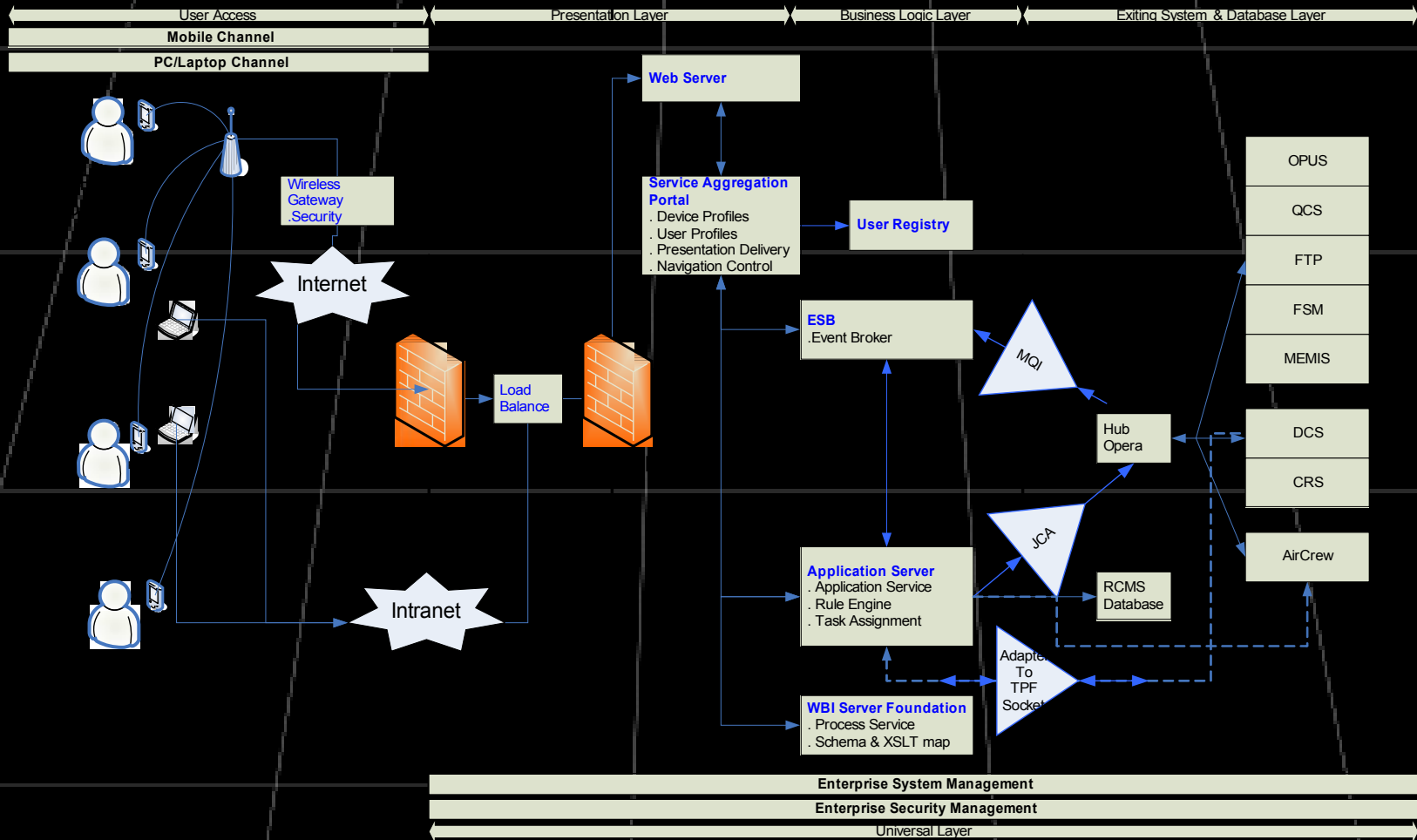
What does an SOA conceptually look like? At the heart of the SOA is the Service Model that defines services and components that realize them.

*Decomposition  
Separation of Concern*

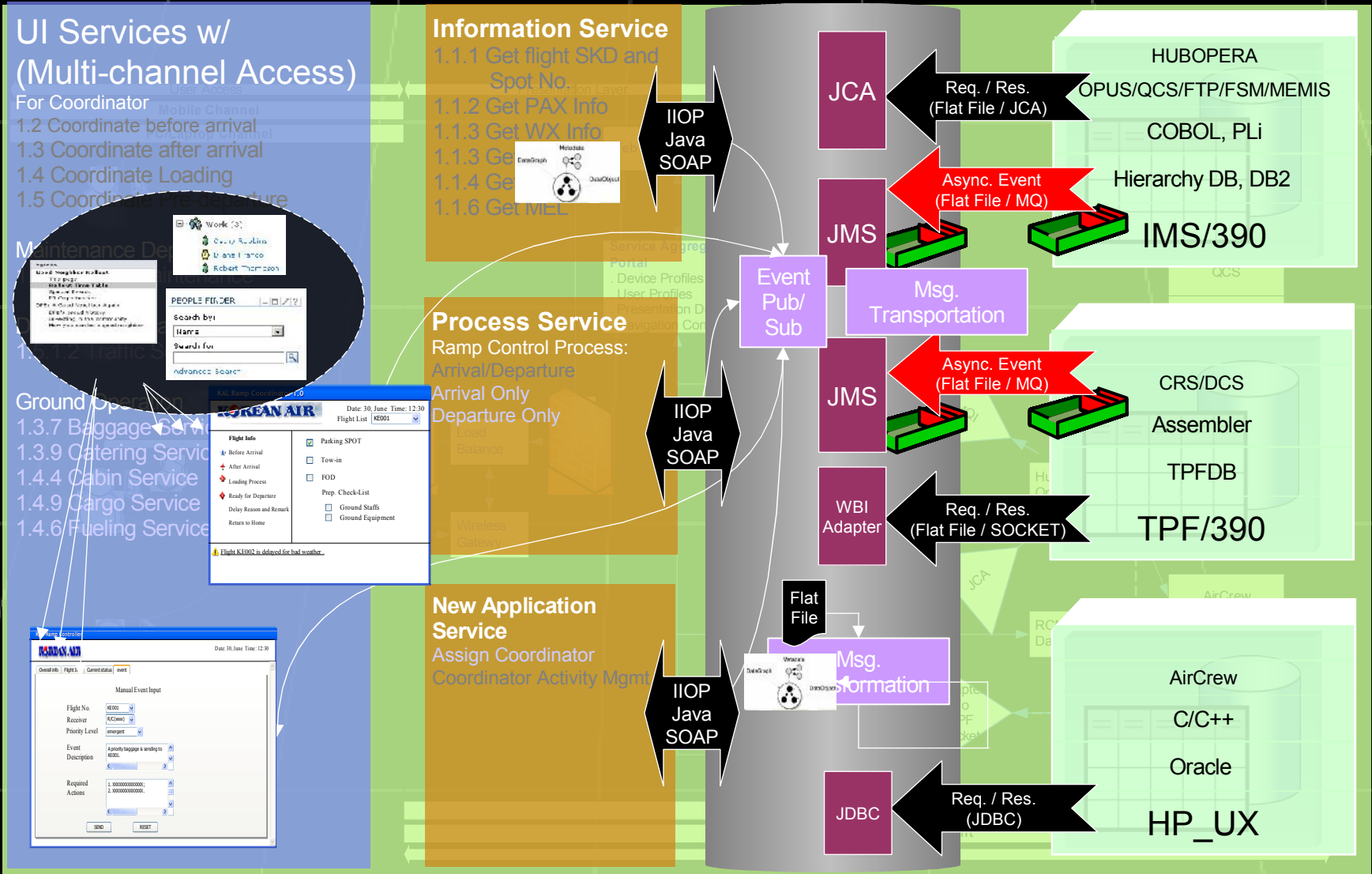
service modeling



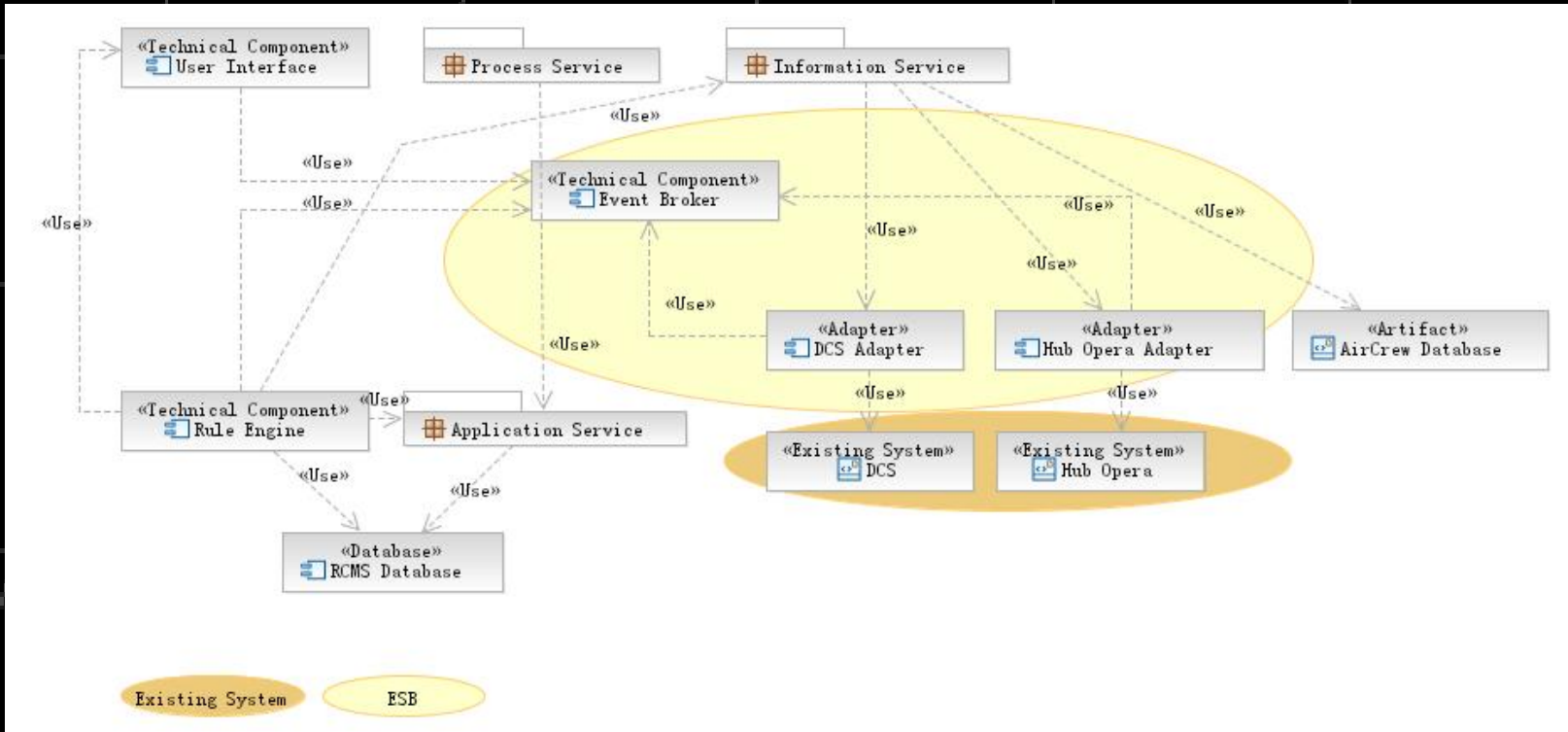
# Korea Air Architecture Overview



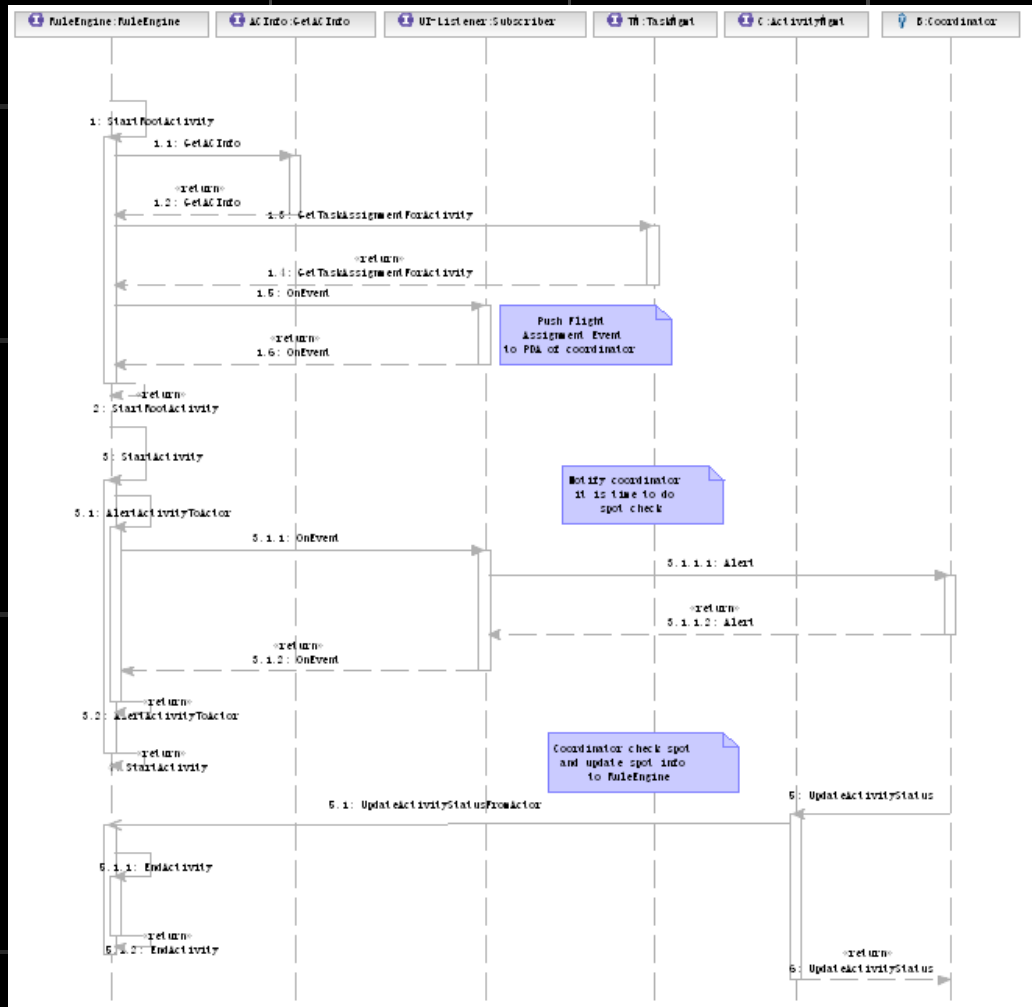
# Concept View



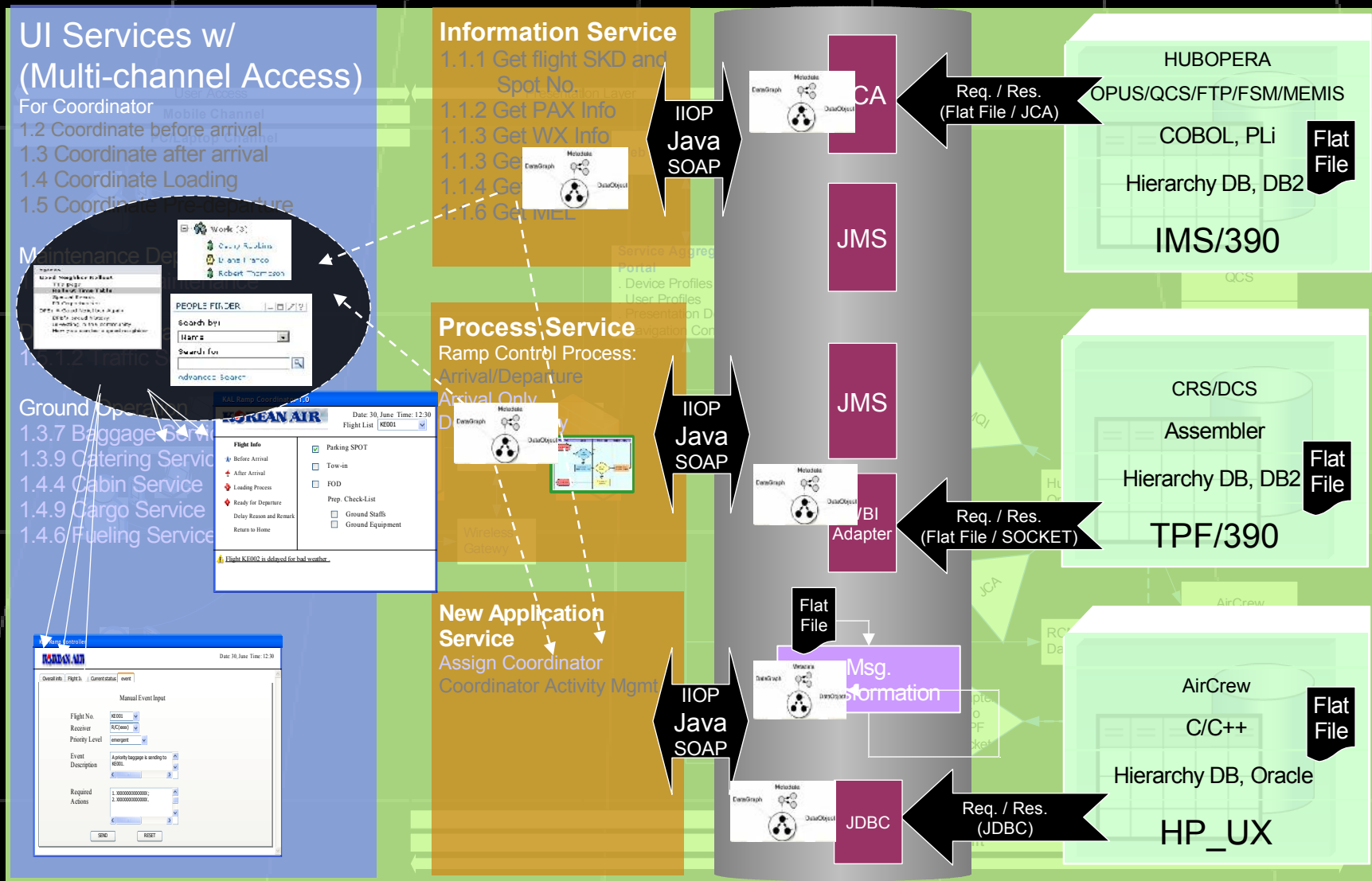
# Components



# Sequence Flow

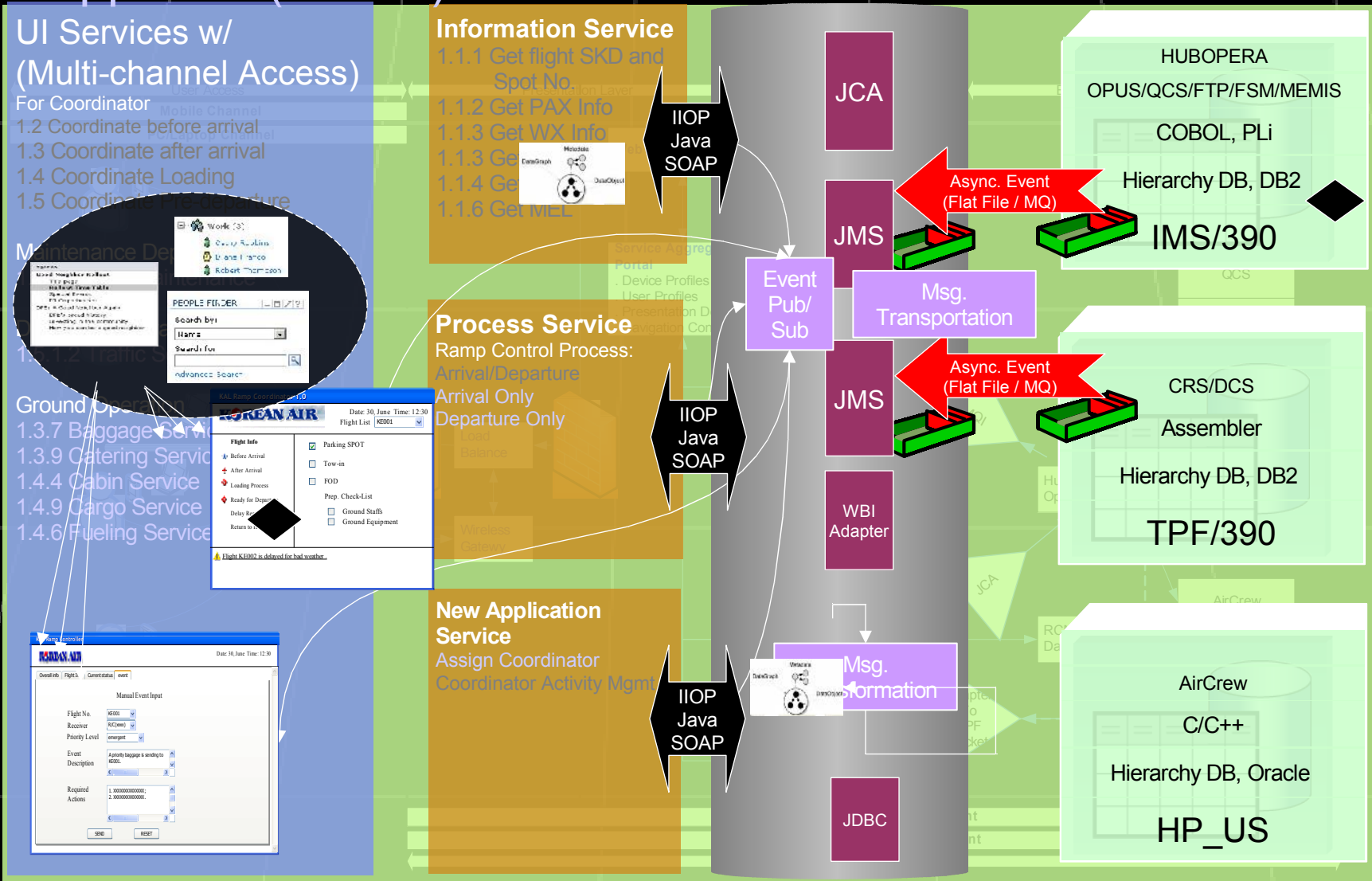


# How real-time information sharing and event notification are supported





# How real-time information sharing and event notification are supported (Cont'd)



# Why it is aligned with "ramp control" business goals

- Cost effective by higher R/C productivity

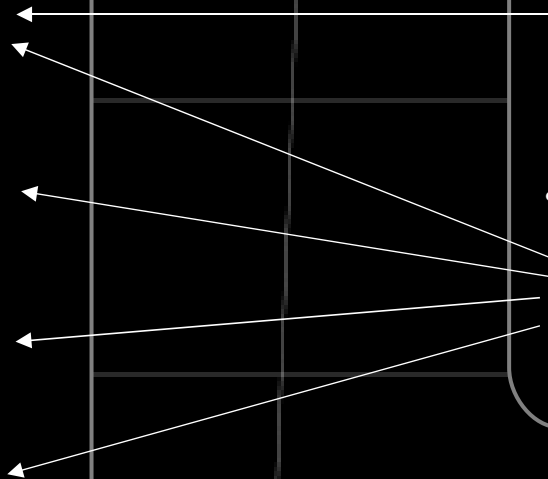
- Better flight utilization with better on-time operation

- Better safety

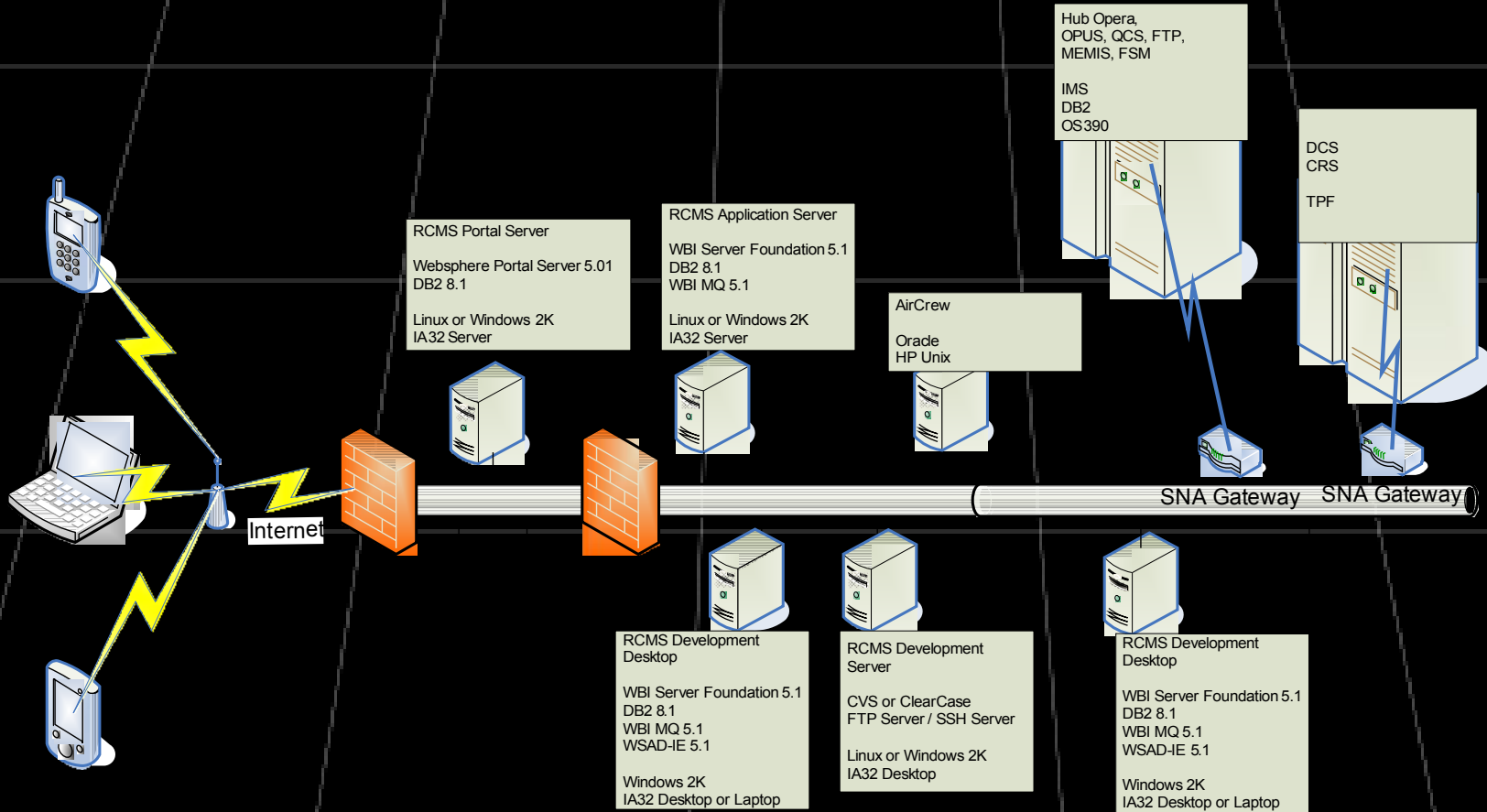
- Better user experience & loyalty

- Get any needed information anytime, anywhere

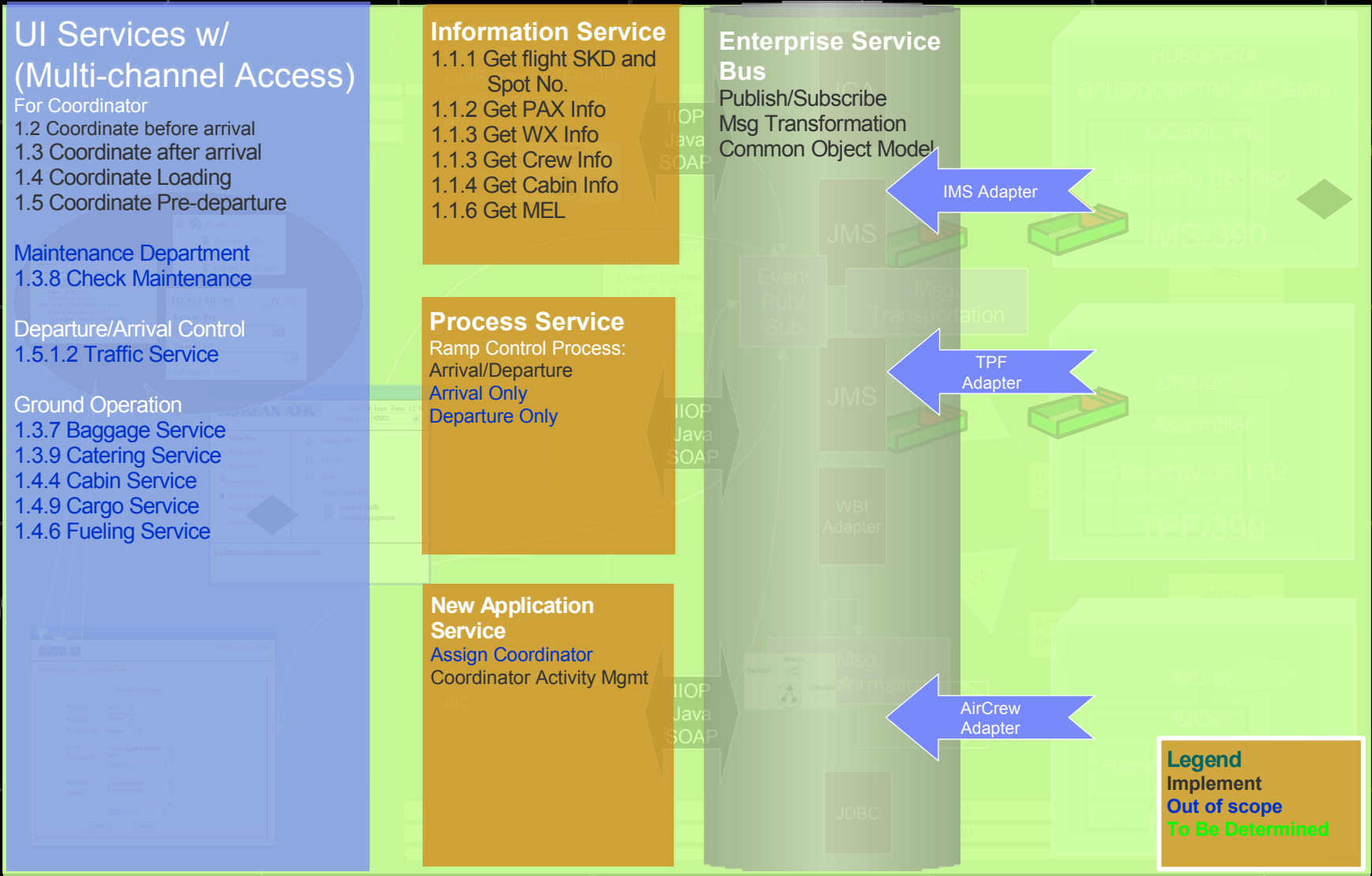
- Get notified by the rule based & configurable events in real-time way



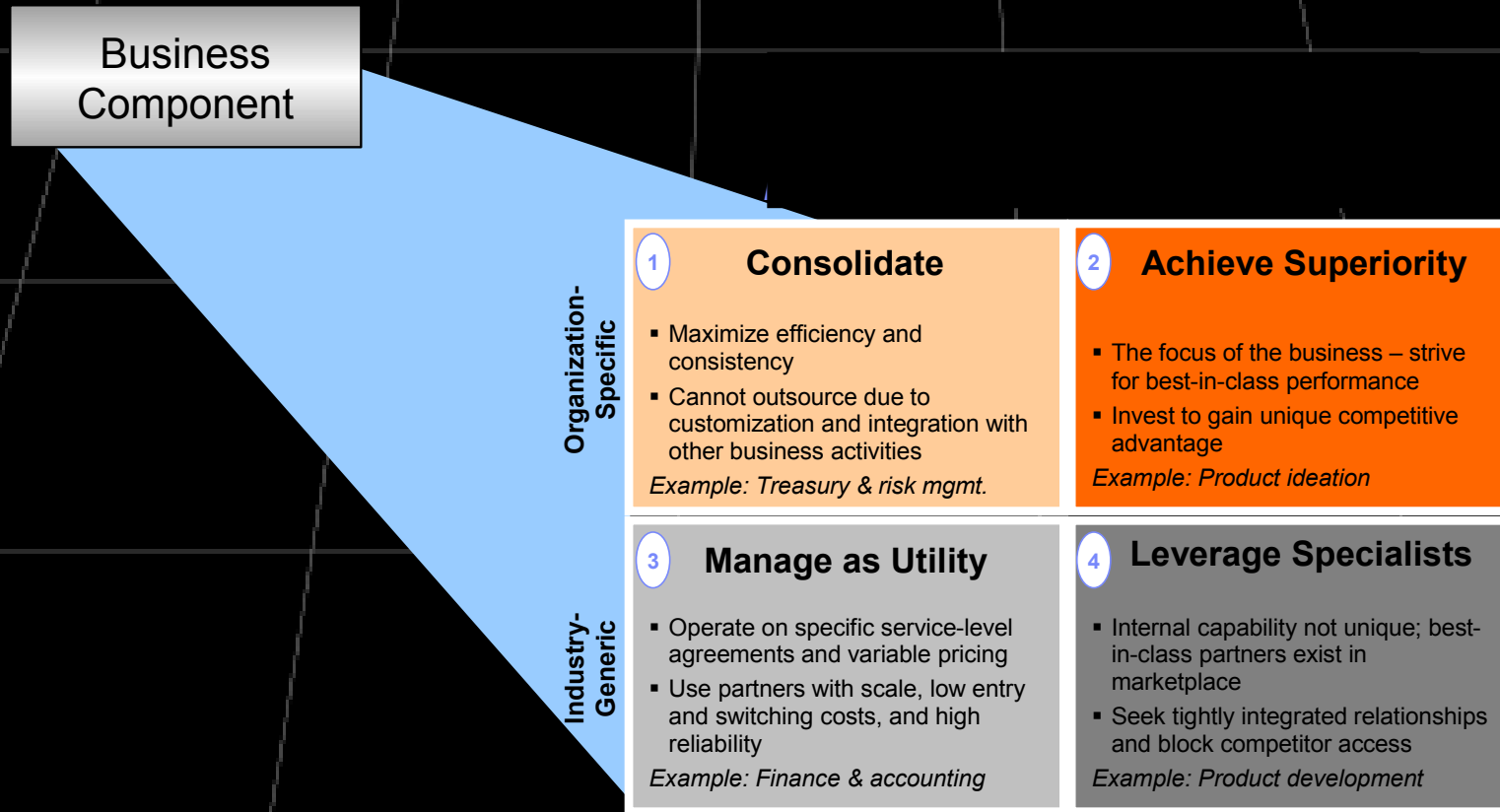
# Operation Model



# The Deliverables of the "KAL First Step"



# The IBM Component Business modeling is used to refine an operating model to support a business vision



By using the Component modeling framework an organization can identify areas that create sustainable value

# Airline CBM – Component Operating Model

ILLUSTRATIVE

Consolidate

Achieve Superiority

Manage As Utility

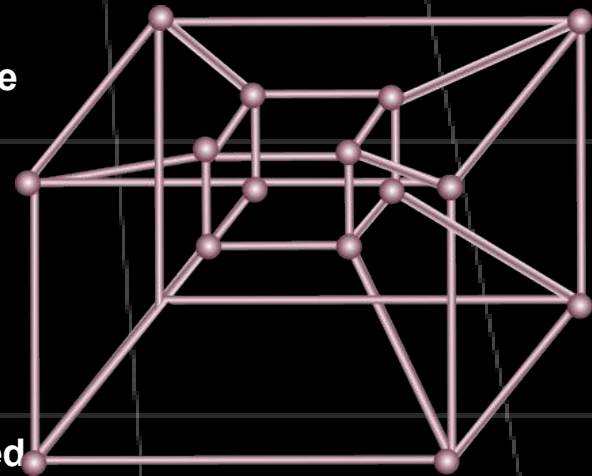
Leverage Specialists

|                                | Business Administration       | Product Management              | Customer Sales                 | Airport Services                | Aircraft Maintenance                      | Flight Operations                 | Business Partners          | Alt Revenue & Cargo Services        |                                       |
|--------------------------------|-------------------------------|---------------------------------|--------------------------------|---------------------------------|---|-----------------------------------|----------------------------|-------------------------------------|---------------------------------------|
| Direct                         | Labor Strategy                | Asset Strategy                  | Brand Management               | Airport Resource Planning       | Maintenance Strategy                      | Flight Planning                   | Alliance Strategy          | Alt Rev & Cargo Strategy            |                                       |
|                                | Corporate Strategy            |                                 | Product Development*           |                                 | Mid - long term Maintenance Scheduling    | Crew Planning                     | Partner Development        | Alt Rev & Cargo Product Development |                                       |
|                                | Finance Strategy              | Fleet Strategy                  | Loyalty Program Development    |                                 | Engineering Configuration                 |                                   | JV & Product Development   | Alt Rev & Cargo Pricing Strategy    |                                       |
|                                | Security Policy Development   | Business Unit Planning          | Network Planning               |                                 | Material Forecasting & Planning           |                                   | Cost Synergy Collaboration |                                     |                                       |
| Control                        |                               | Pricing Strategy                |                                |                                 |   |                                   |                            |                                     |                                       |
|                                | Business Performance Mgmt     | Financial Planning              | Market Tracking                | Channel Tracking                | Airport Resource, Scheduling & Assignment | Maintenance Planning & Scheduling | Aircraft Assignment        | Partner Value Tracking              | Alt Rev Tracking & Control            |
|                                | Program Management & Tracking | Assets & Facilities Management  | Market Research                | Sales Tracking                  | Gate Assignment                           | Manpower Planning                 | Crew Administration        | Alliance Value Tracking             | Cargo Revenue Management              |
|                                | Legal                         | Tax, Treasury & Risk Management | Campaign Administration        | Loyalty Program Administration  | Station Operational Performance           | Technical Publications Management | Flight Training            |                                     | Cargo Network & Scheduling            |
| Execute                        | Human Resources Management    |                                 |                                | IRR Ops Management              |   | Material Supply / Demand Planning | Operational Performance    |                                     |                                       |
|                                |                               |                                 |                                |                                 | Ground Support Equipment Management       |                                   | System Resource Management |                                     |                                       |
|                                | IT Systems                    | Product Implementation          | Call Center Reservations       | Airport Customer Experience     | Engineering Design                        |                                   | Flight Execution           | Codeshare Administration            | Alt Rev Business Dev & Freight Sales  |
|                                | External Relations            | Marketing Communications        | Web Direct Reservations        | Check-in                        | Material Logistics                        |                                   | Flight Services            | Revenue Sharing Administration      | Alt Rev & Cargo Operations            |
|                                | Corporate Purchasing          | Revenue Mgmt                    | Sales Execution                | Pax Departure / Arrival Control | Aircraft Heavy Maintenance                |                                   | Flight Reporting           |                                     | Alt Rev & Cargo Billing & Collections |
|                                | Revenue Accounting            | Schedule Development            | Fulfillment / Reporting        | Lounge Services                 | Aircraft Line Maintenance                 |                                   | Slot Management            |                                     | Cargo Accounting                      |
|                                | Corporate Accounting          |                                 | Corporate Sales Administration | Catering                        | Component Repair & Overhaul               |                                   | Flight Monitoring          |                                     | Alt Rev & Cargo Customer Service      |
|                                | Corporate Communications      |                                 | Customer Relations             | Cabin Cleaning                  | Engine Repair & Overhaul                  |                                   | Training Delivery          |                                     |                                       |
| Human Resources Administration |                               |                                 | Planeside Services             | GSE Repair & Overhaul           |   |                                   |                            |                                     |                                       |
|                                |                               |                                 | Baggage Handling               |                                 |   |                                   |                            |                                     |                                       |
|                                |                               |                                 | Security Execution             |                                 |   |                                   |                            |                                     |                                       |

## Service or Asset Transformation Needs to be Incremental...Controlled

### Designing & Deploying SOA

- Deconstruct the business into discrete business processes and functions across all dimensions of the business
- Processes and functions are then transformed into “service components”
- These service components dynamically interact with other service components using agreed-upon contracts, cost structures and service levels
- SOA Governance Model aids Services in being reused repeatedly with other business processes within the larger Business Model.
- The Result... substantial saving, greater controls and consistency, reduced time to market and substantially improved efficiency



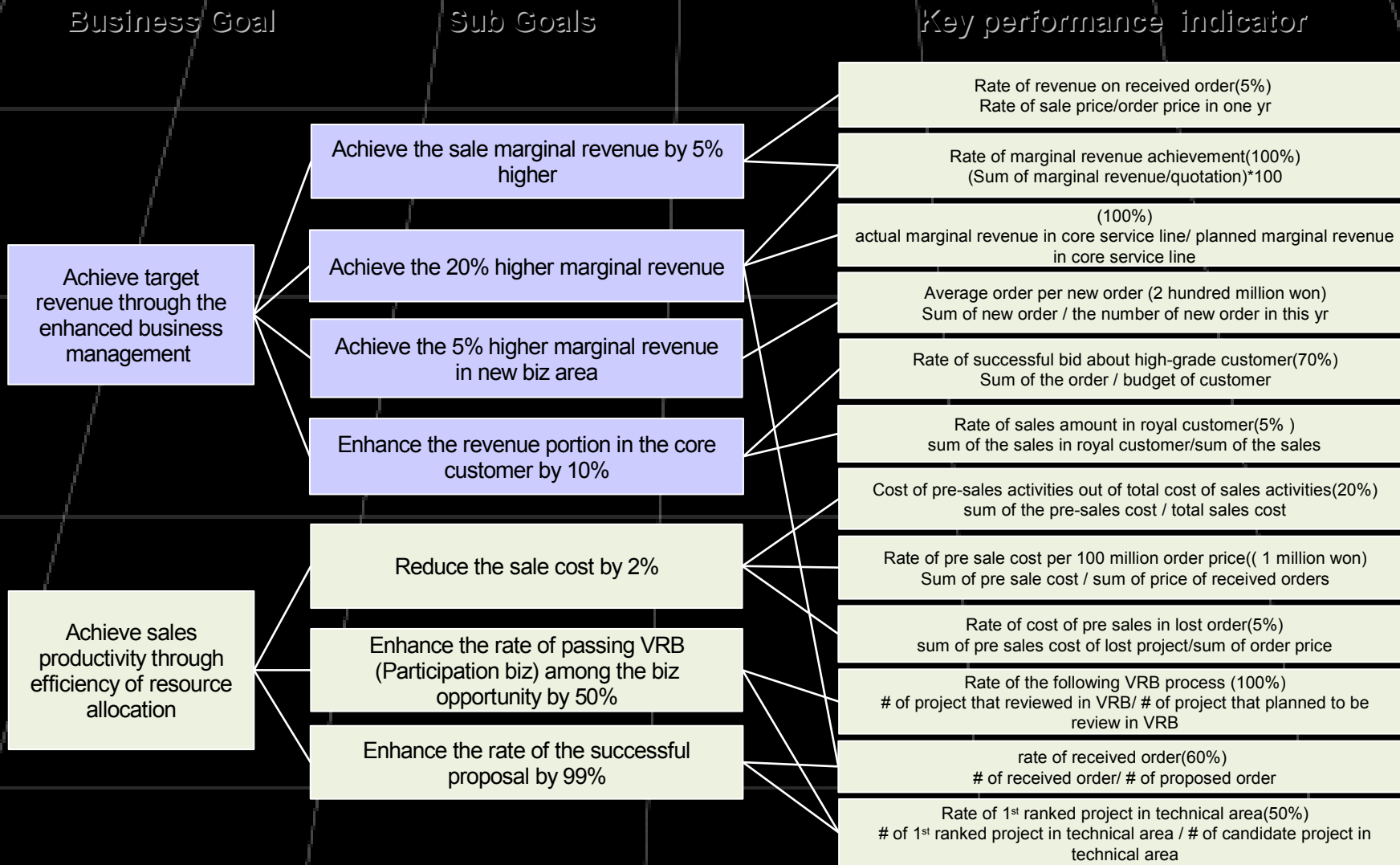
*Service Integration is a matter of managing multiple dimensions, all moving in their own directions; all interconnected; all inter-dependent*

# Business domains and business components related to Opportunity Management System

|         | IT Customer Relationship Management | IT Business Management               | Business Resilience        | Information & Knowledge Management | Service and Solution Development          | Service and Solution Deployment | Service Delivery and Support |
|---------|-------------------------------------|--------------------------------------|----------------------------|------------------------------------|---|---------------------------------|------------------------------|
| Direct  |                                     |                                      |                            |                                    |   |                                 |                              |
| Control |                                     | Financial Management                 |                            |                                    | Services and Solutions Lifecycle Planning |                                 |                              |
|         |                                     |                                      | Integrated Risk Management |                                    |   |                                 |                              |
|         |                                     |                                      |                            |                                    |   |                                 |                              |
| Execute |                                     |                                      |                            |                                    |   |                                 |                              |
|         |                                     |                                      |                            |                                    |   |                                 |                              |
|         | IT Services and Solution Marketing  | Supplier and Contract Administration |                            |                                    |   |                                 |                              |



# Defined Business Goals



# Business Process for Opportunity Management

Opportunity Management

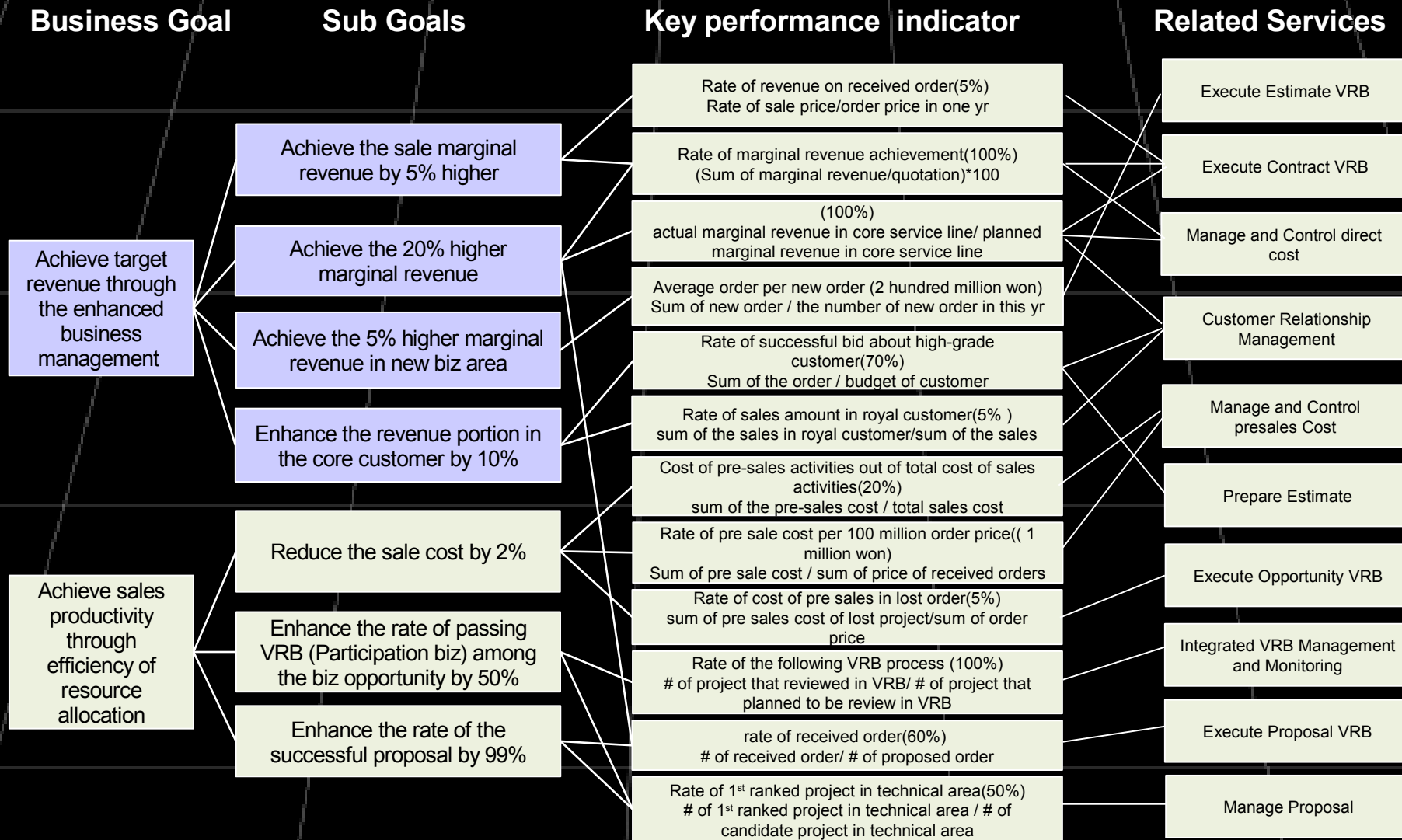
## Sales Process



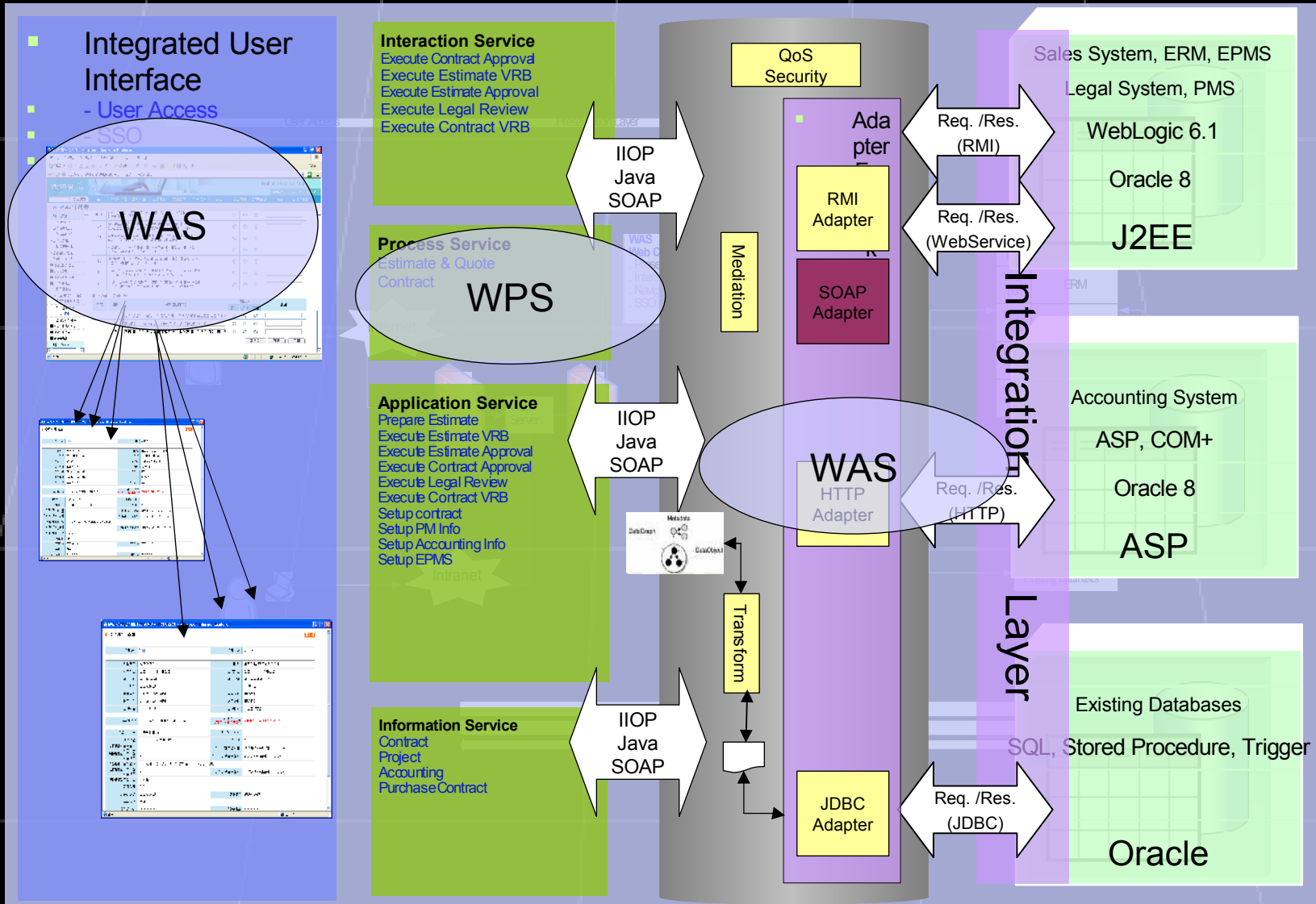
# Detailing the Estimate & Quote process



# Align Service With Business Goals

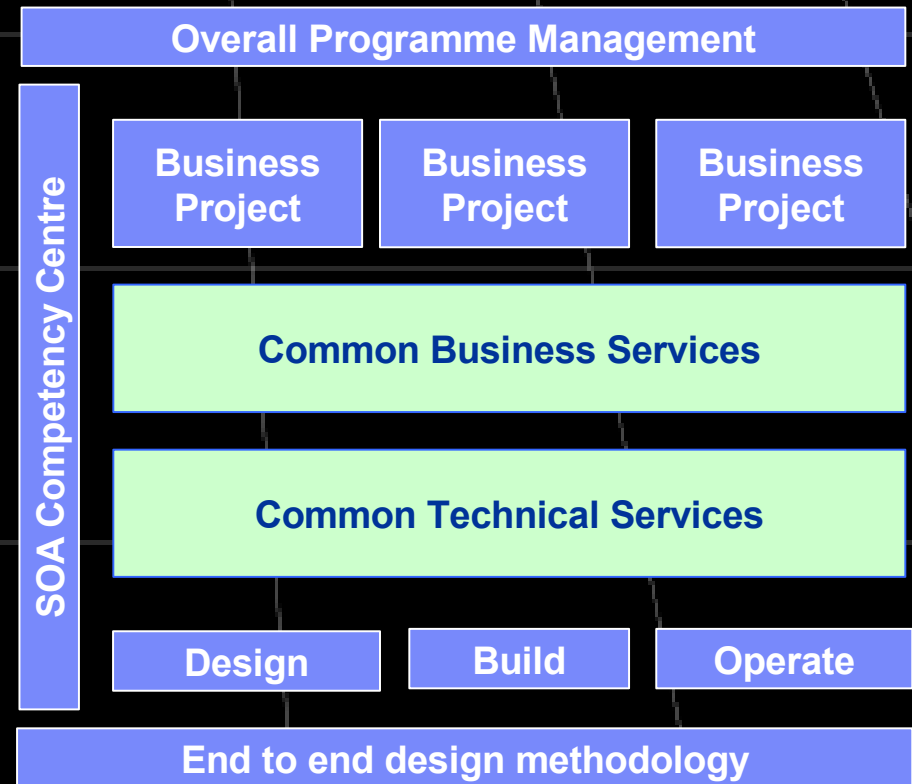


# Services Implementation



For SOA to succeed, it is a **REQUIREMENT** that a convergence around organizational models occurs. This must be put in place first.

- The core organizational model for an SOA is the SOA Competency Centre, including best practices for the design authority that provides a technical governance model. This ensures that:
  - projects do not create duplicative and incompatible business services, technical services & interfaces
  - projects can create artefacts at multiple levels that are highly reusable, i.e.. design patterns, process documentation, software modules
  - “Standards for Architecture” are adopted, i.e.. development and documentation, development environment and tooling.
- A second, but fundamental organizational model pertains to the creation of a definitive business governance structure, to run in parallel with the technical governance model. This must be established across linked business projects to provide business governance and ensure:
  - Common business services view
  - Compatible SOA implementation
  - Management of business priorities
  - Management of interdependencies



# The proposed details for each step are provided as a roadmap to assist with the transformation

## Set up SOA Core Team and Establish Governance

- Clarify Executive Sponsor
- Conduct Change Readiness Assessment
- Select SOA CoE Board Director & SOA CoE Board
- Select Business Service Champion, Chief Service Architect, Service Registrar, Business Service Analyst and Project Manager
- Select SOA CoE Advisory Group members
- Identify virtual/rotational/project team resources for all roles (enterprise wide)
- Develop/adapt standards for SOA CoE, i.e. architecture and services
- Communicate/Educate Management and Passport Team on architecture, services and governance process
- Utilize selected vendors to provide knowledge transfer on SOA
- Begin steps for cultural change

## Institutionalize SOA CoE Processes, Standards and Governance

- Monitor the improvement in the governance capability model and measure against baseline
- Document measured successes in implementing SOA and communicate to enterprise stakeholders
- Monitor the operating processes and standards initially developed and modify as needed for continuous improvement
- Communicate/Educate Management and Passport Team on architecture, services and governance process
- Adjust governance process as needed to ensure adoption
- Develop services repository and train stakeholders in identification of potential services for reuse
- Move toward utilization of internal experts on SOA to continue knowledge transfer
- Continue cultural change initiatives

## Integrate SOA CoE Core Team into Day to Day Operations

- Begin decomposition of SOA CoE Core Team
  - Integrate roles back into business and IT operations
  - Maintain SOA CoE Board, SOA CoE Advisory Group and SOA CoE Board Director
  - Migrate Business Service Champion role into the Business Relationship Director role
- Continue to monitor compliance with governance process and address non-compliance ASAP
- Continue to expand and maintain service repository

धन्यवाद

Hindi

Hindi

多謝

Traditional Chinese

ขอบพระคุณ

Thai

Спасибо

Russian

Gracias

Spanish

Merci

French

شكرا

Arabic

Obrigado

Brazilian Portuguese

Thank You

English

Danke

German

Grazie

Italian

多谢

Simplified Chinese

நன்றி

Tamil  
Tamil

ありがとうございました

Japanese

Teşekkürler

turkish

감사합니다

Korean