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, utilzing 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

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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

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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

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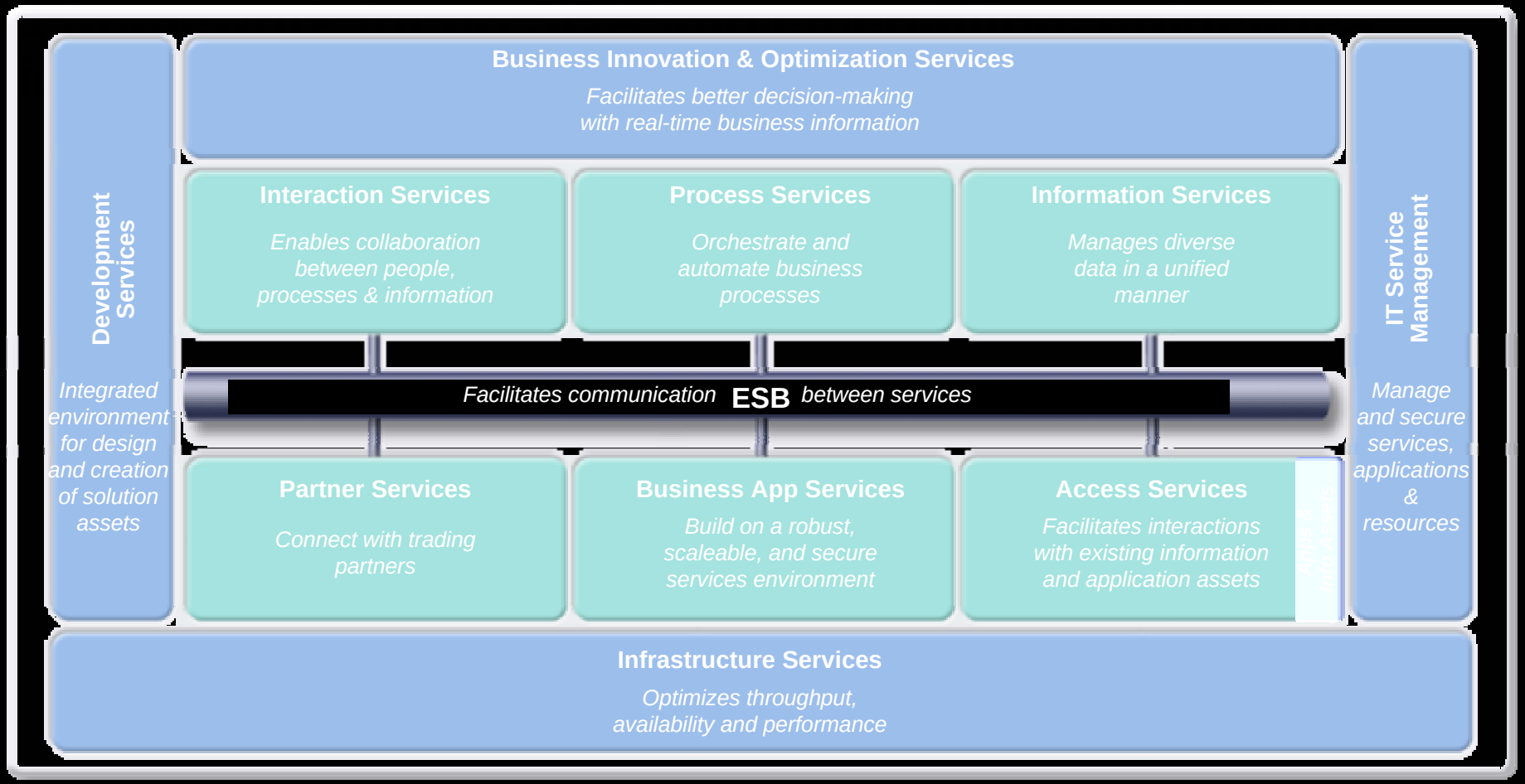
The SOA Reference Architecture provides a roadmap



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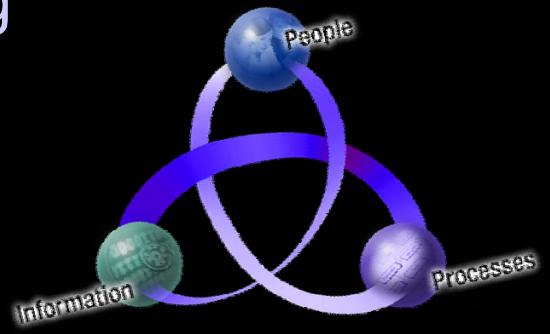
SOA begins by working within your existing environment



1 Creating an SOA Framework can begin anywhere within an Organizational Structure. Experience suggests that Business challenges or IT challenges may obviate the need for a Services Framework

People

Processes

Information

Integration

Reusable Services

Packaged Applications

Custom Applications

Data Elements

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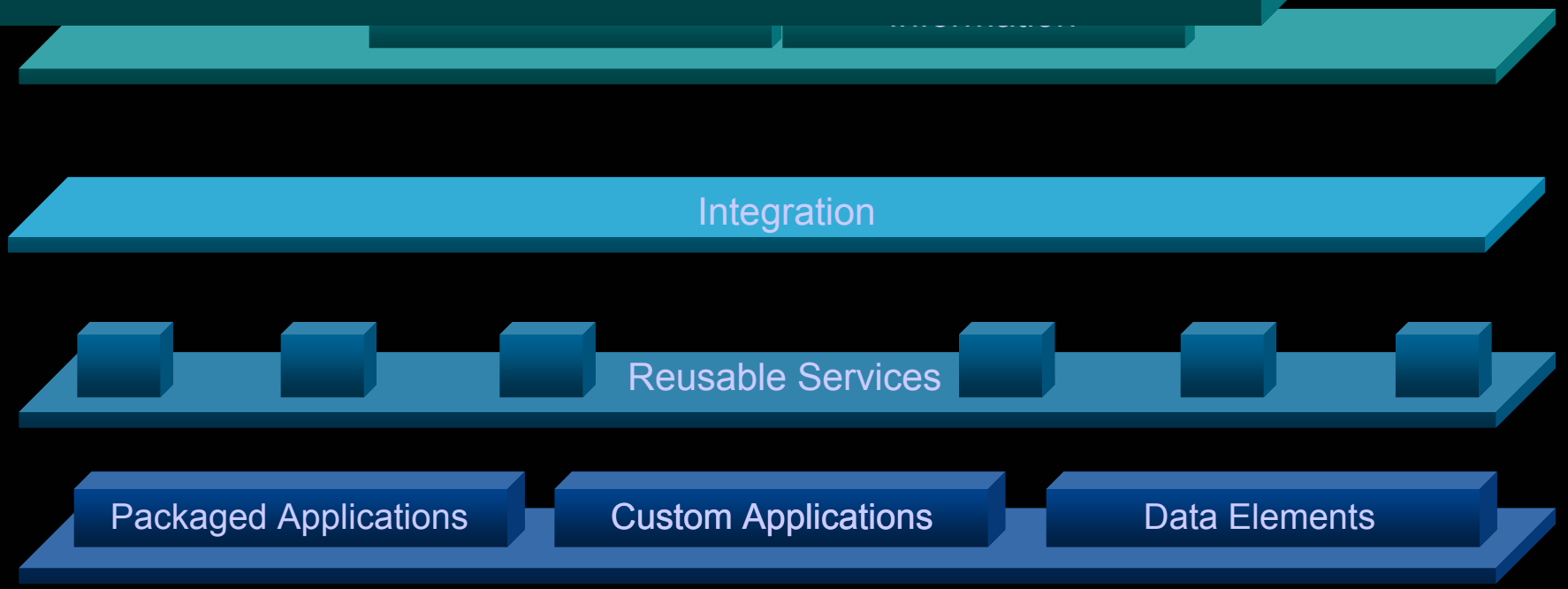
2 A Business challenge occurs as mergers, acquisitions, changes in the business environment or new demands on products, product launches, customer needs emerge. In these cases it is the "business drivers" not the technical drivers pushing for change, IT must then become a facilitator



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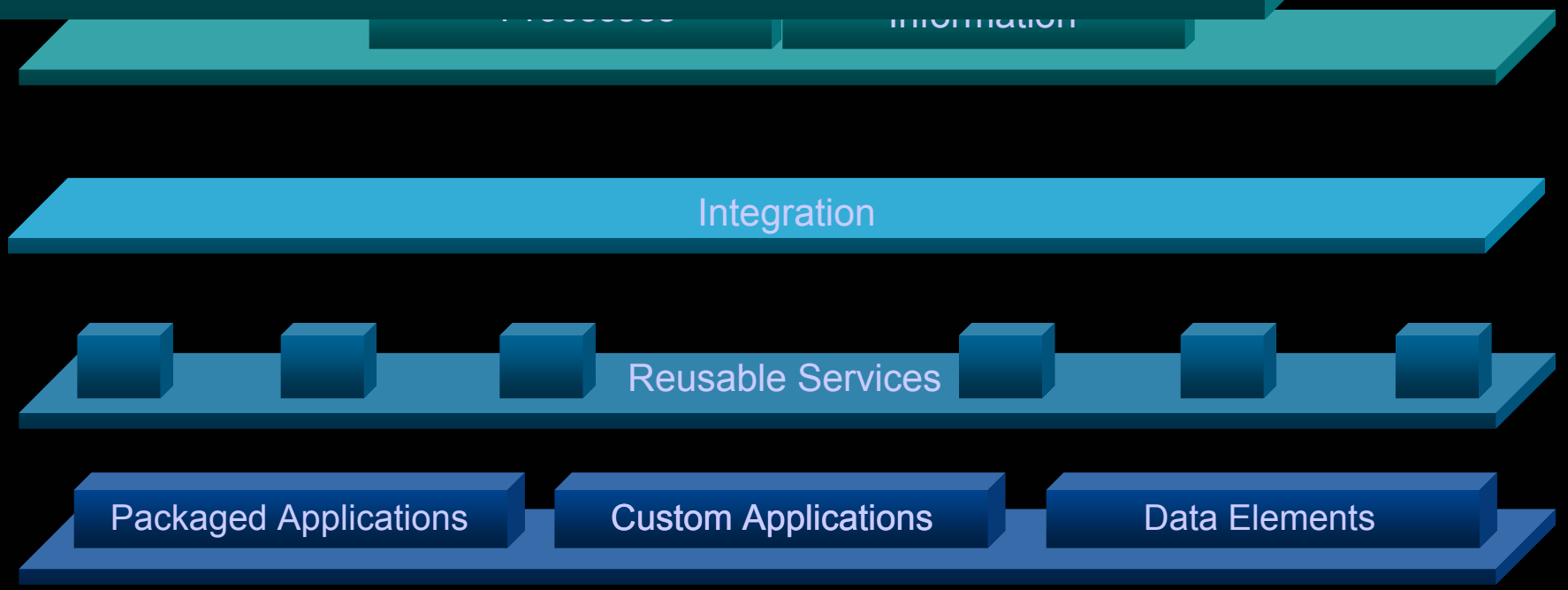
3 To ensure success both Business and IT challenges need to be managed within the context of an overarching SOA Governance Plan. Governance is the lynchpin for a disciplined approach both in the construction of business process and related workflows, to the management of these workflow and accountabilities upon execution.



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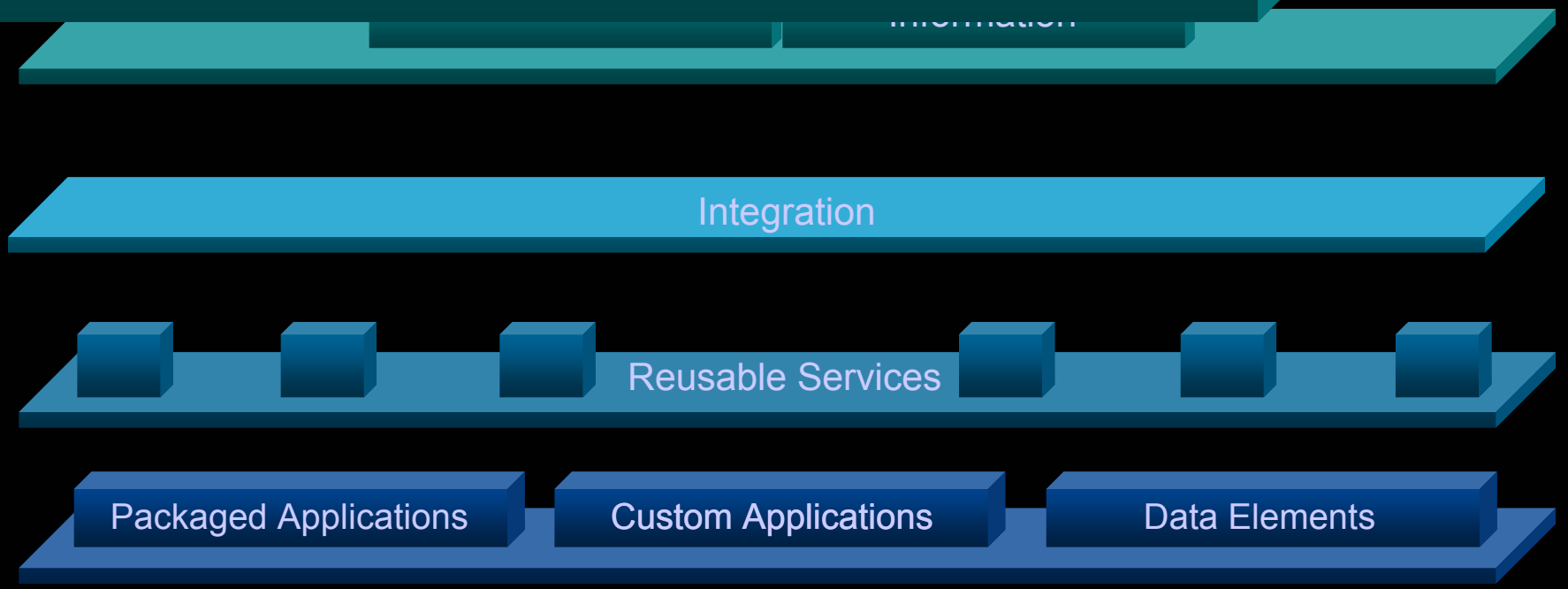
4 SOA is a conceptual framework, thus relies on an "integrated" stack of connectivity and a vertically managed message and transaction management flow. It is not achieved without:

1. a clear vertical view of a process (throughout the system) and
2. a comprehensive services management backplane.



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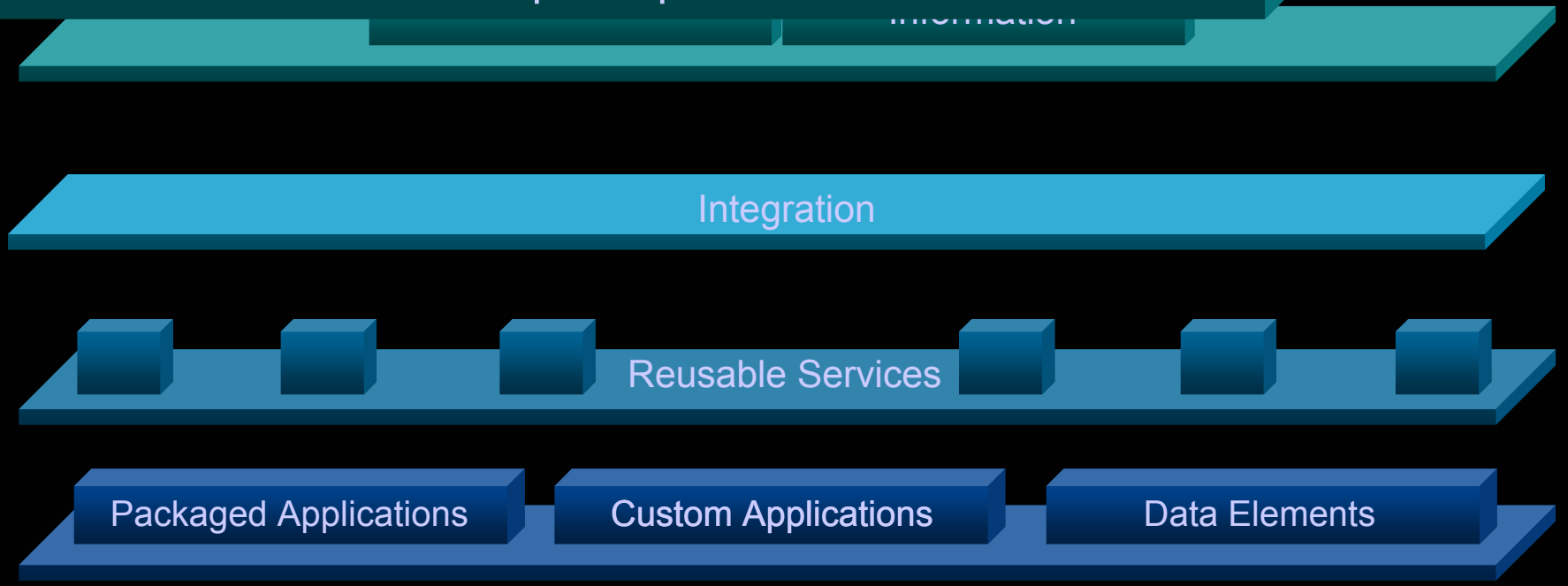
5 SOA Transformation occurs by vertically identifying the designated business process, establishing the various workflow and choreography issues, determining transformations, routings, process calls, collaborations, policies, rules, protocols, mediations, data processes, and ensuring a coordinated process flow. Building an SOA "horizontally" does not allow for these prerequisites



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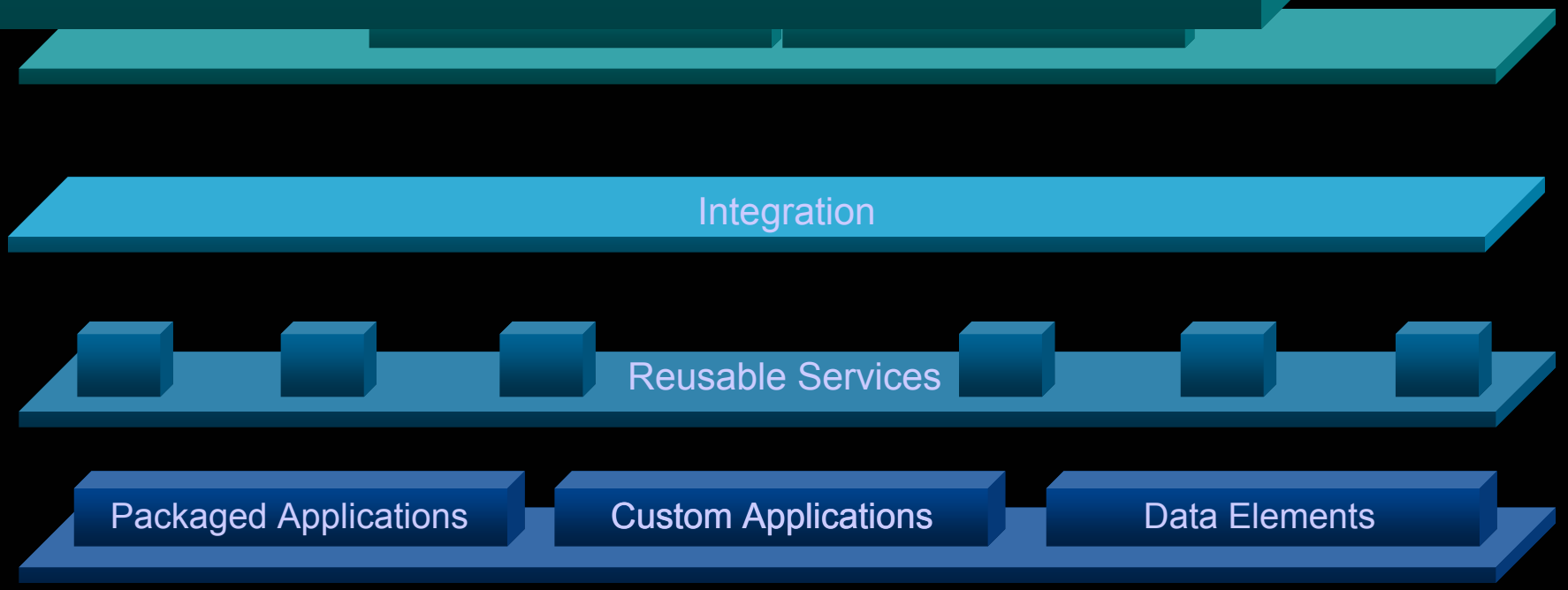
6 Beginning with a defined business process or set of process (composite application) the first step is to create the actual business scenario or “case”. In most instances business owners (internal) may have a defined set of procedures they choose to follow in the creation of new business processes, and in most companies there are multiple business “methodologies” employed by multiple owners. In all cases the requirements of a “governed” process is usually lacking. This an essential first step
There are many methods available to “decompose” a business process, however to instantiate an SOA some level of Business Process Decomposition is required to ascertain the elements of the business requirement's)



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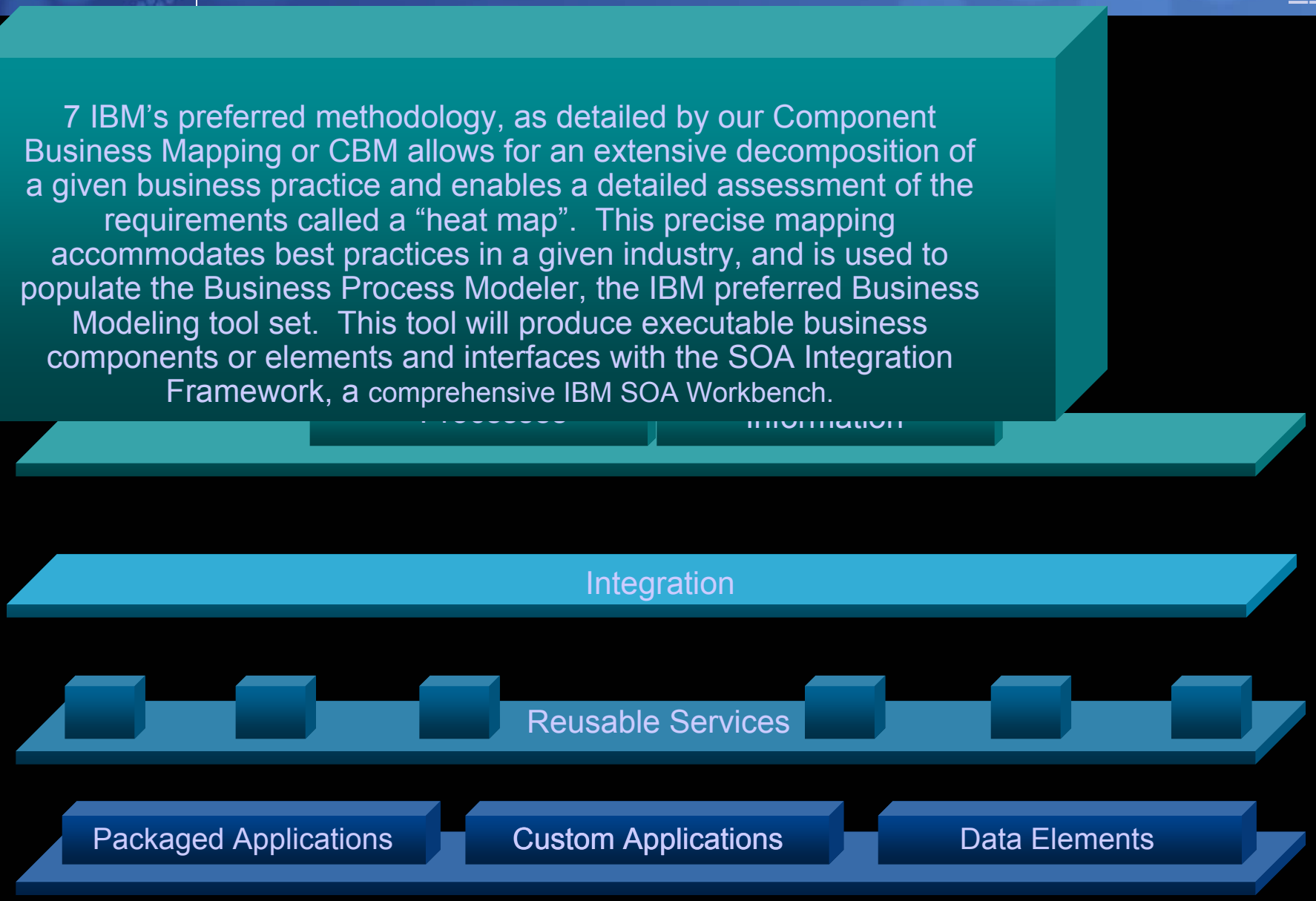
7 IBM's preferred methodology, as detailed by our Component Business Mapping or CBM allows for an extensive decomposition of a given business practice and enables a detailed assessment of the requirements called a "heat map". This precise mapping accommodates best practices in a given industry, and is used to populate the Business Process Modeler, the IBM preferred Business Modeling tool set. This tool will produce executable business components or elements and interfaces with the SOA Integration Framework, a comprehensive IBM SOA Workbench.



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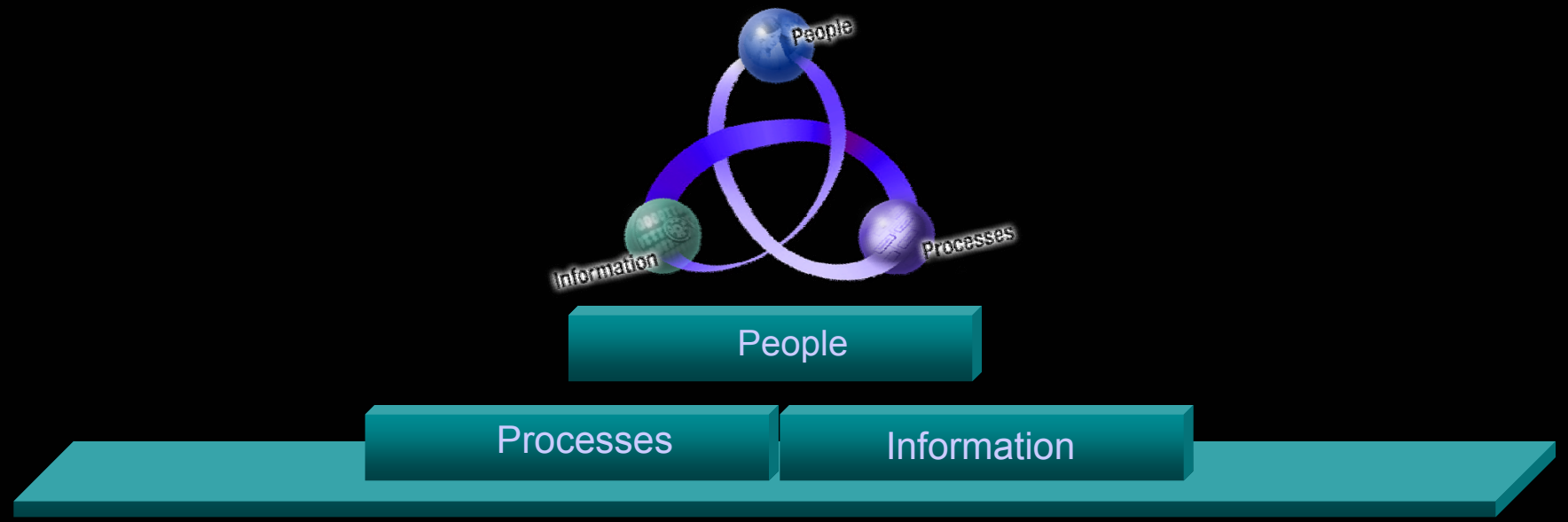

Integration

Packaged

8 An Infrastructure challenge occurs as the need for “common services” becomes apparent; this “inside-out” model look at all the constraints of connecting to Legacy DBs, Main Frames, Application Environments, CRMs

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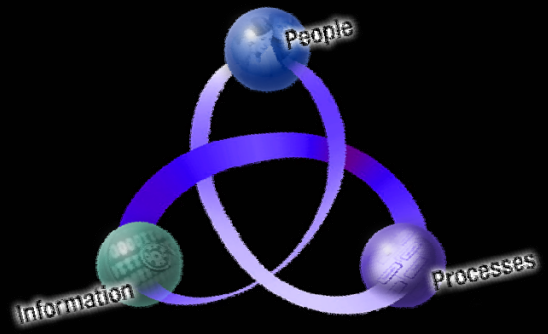

People

Processes

Information

Integration

Package

9 A well practiced misnomer is in believing that the creation of a "common service" layer above the Legacy framework constitutes an SOA. In fact, it creates a set of WSDLs, XML objects, or other methods that "enable", expose, or adapt the historical data, application or main frame environment. Necessary but not sufficient in the design of an SOA

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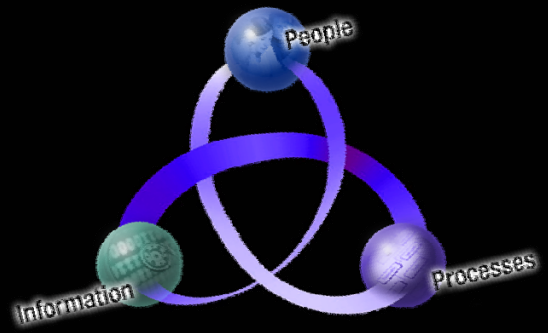

People

Processes

Information

Integration

Packaged

10 In the “enablement” of the legacy applications, data or mainframes the establishment of an adaptor and/or connector layer is critical, as it creates the first level of abstraction into the required systems. As is the case with Business process, these object or their output all require “management” to become effective residents of an SOA

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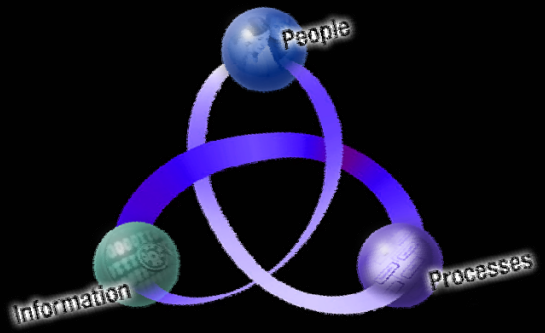

People

Processes

Information

Integration

Packaged

11 There remains the need to also manage the actual infrastructure as it is integrated into the overall SOA framework.

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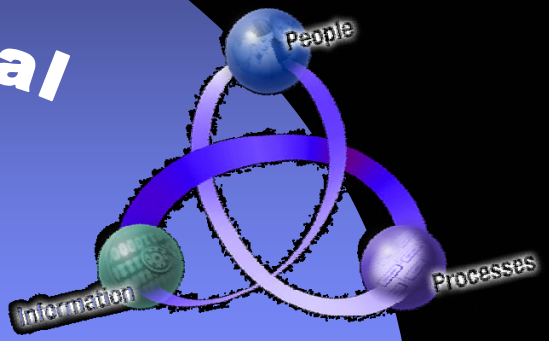
Governance is a crucial constituent element of any SOA Framework



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Reusable Services

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Data Elements

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Governance is a crucial constituent element of any SOA

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.

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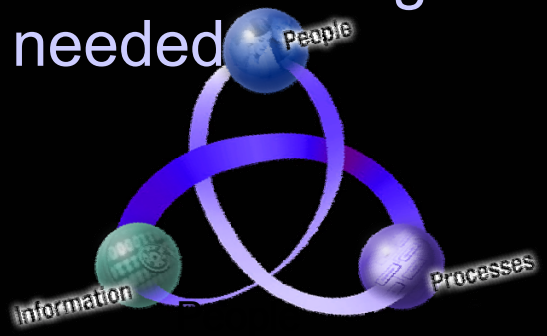
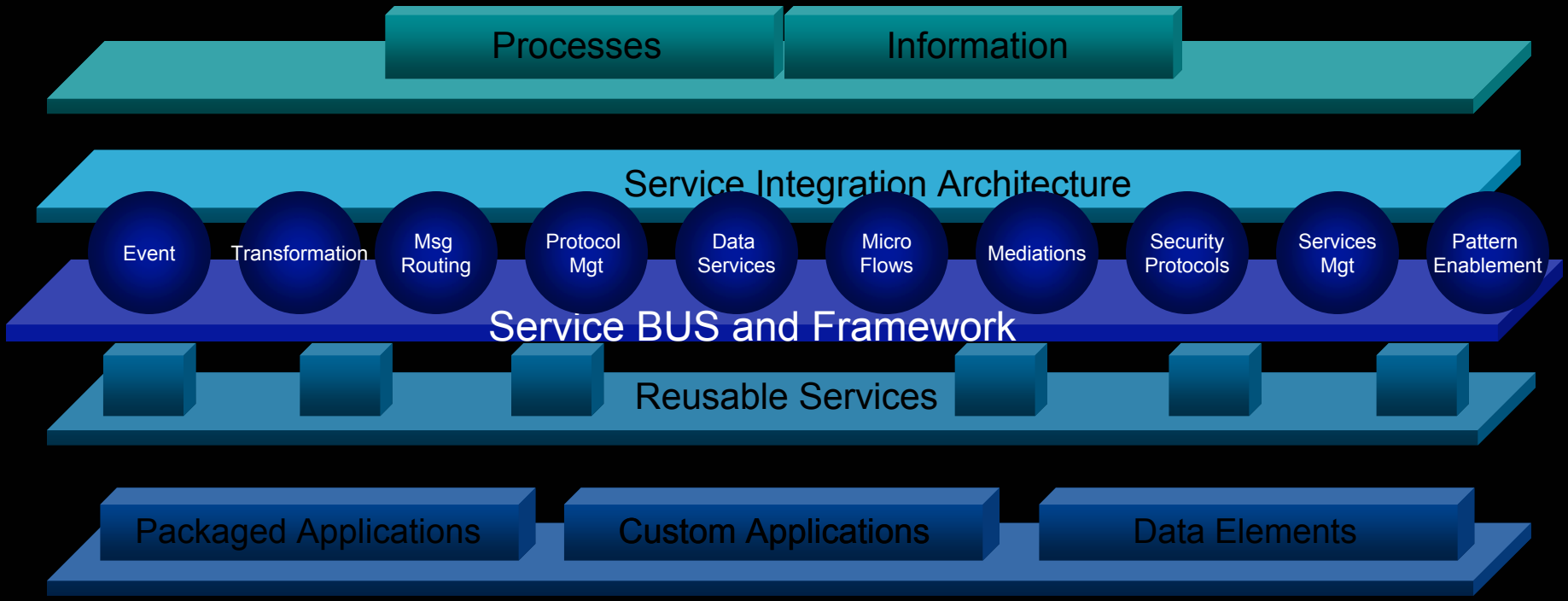
Decomposing Business Processes deploying them through a Pattern Engine and executing them as needed utilizing the IBM ESB





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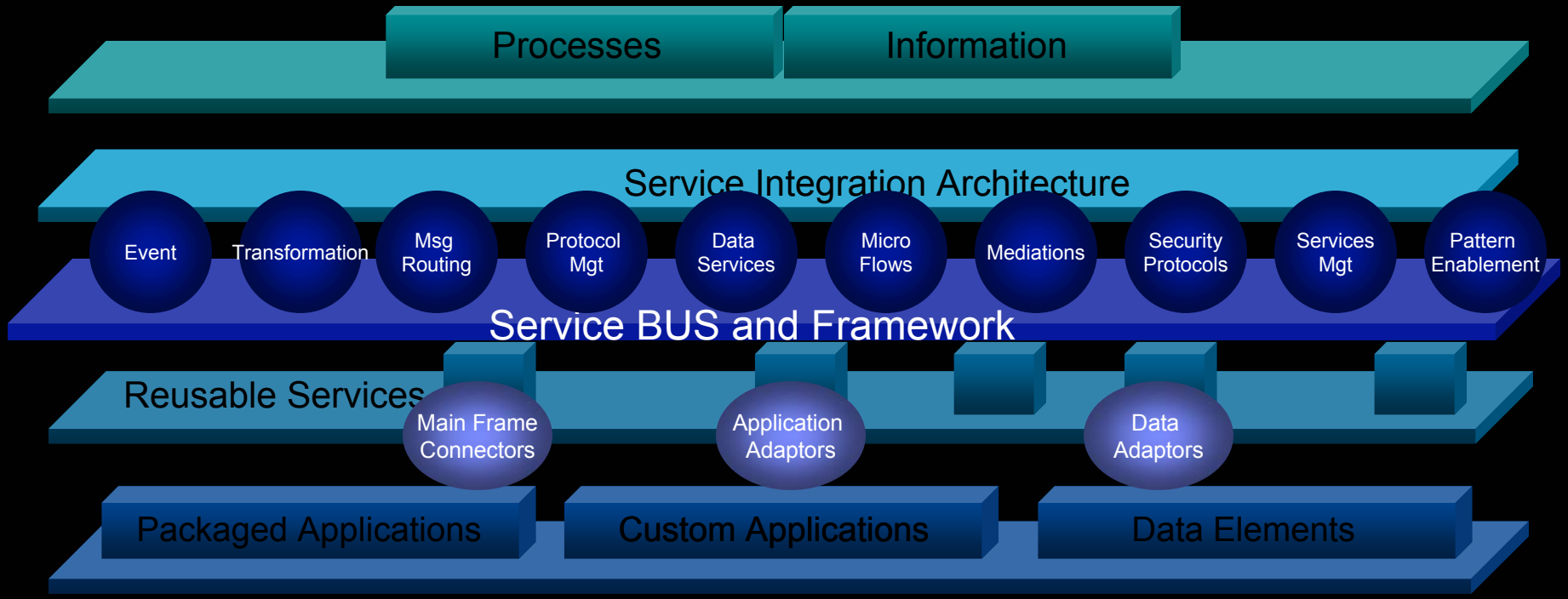
Simultaneously, an adaptor and connector environment will exist to ensure complete connectivity to the application, data and mainframe environments. These "services" are semantically adapted to the services management



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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.

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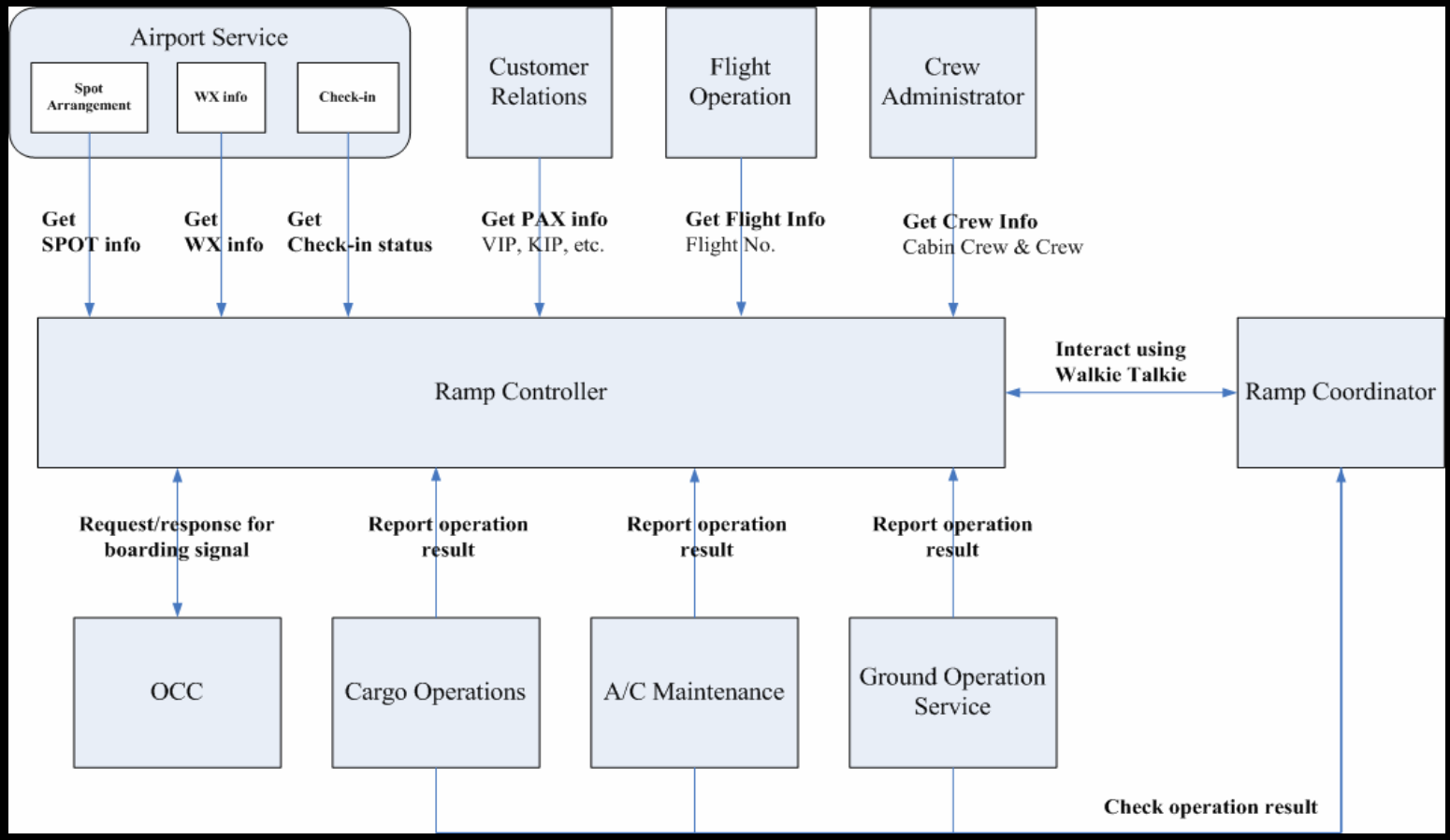
The Business Context



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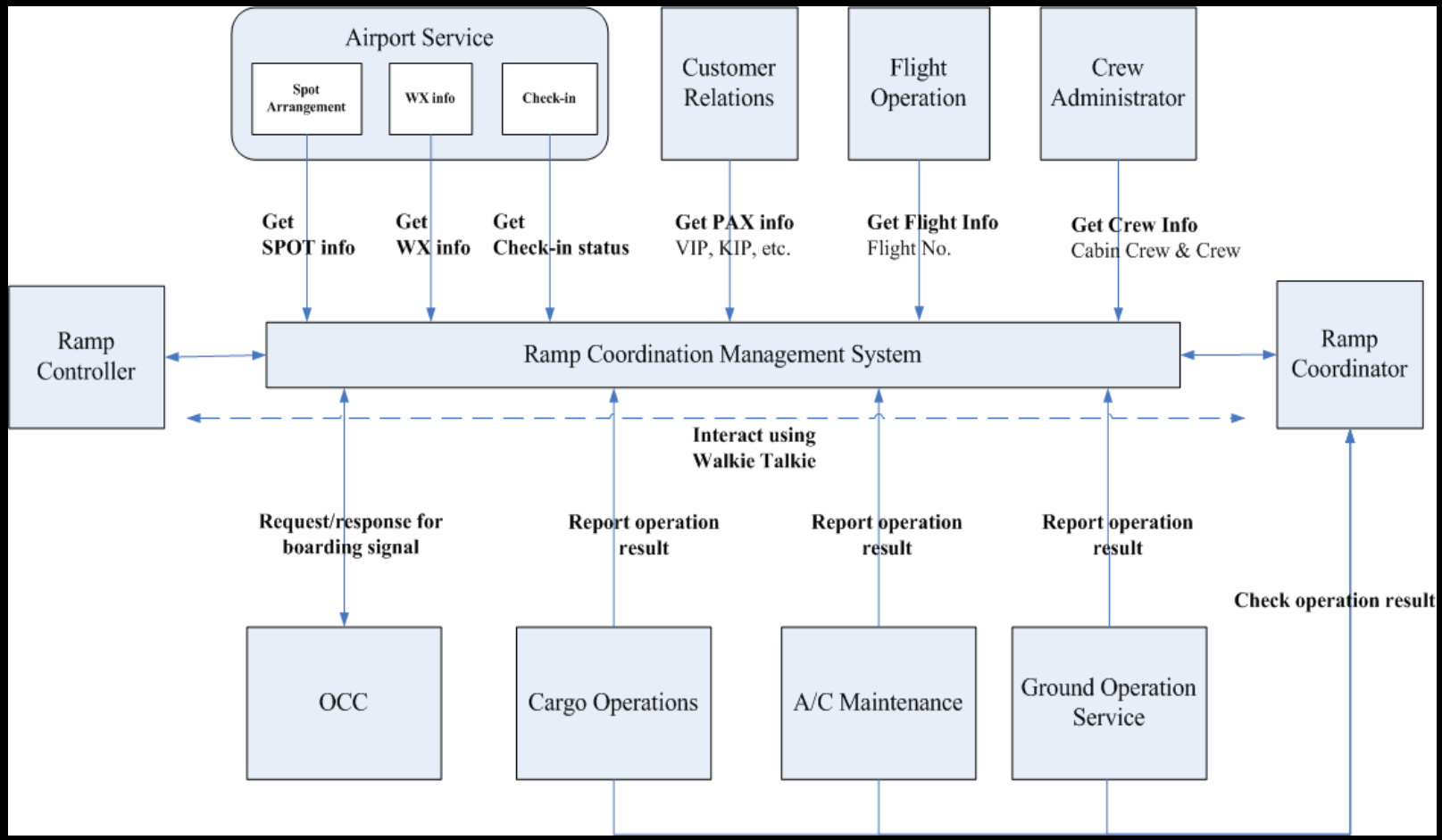
Resultant SOA Business Context



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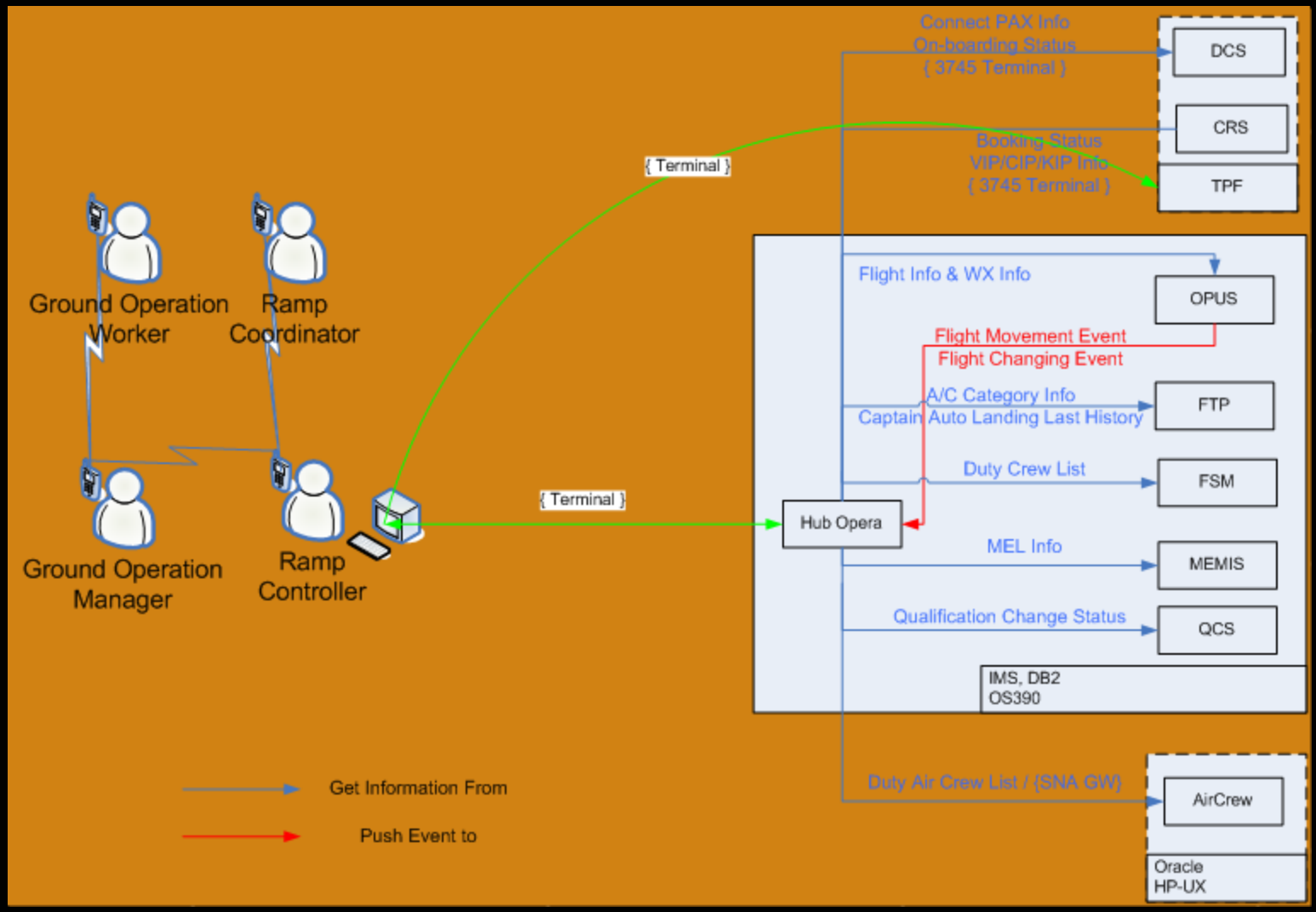
Existing IT Context



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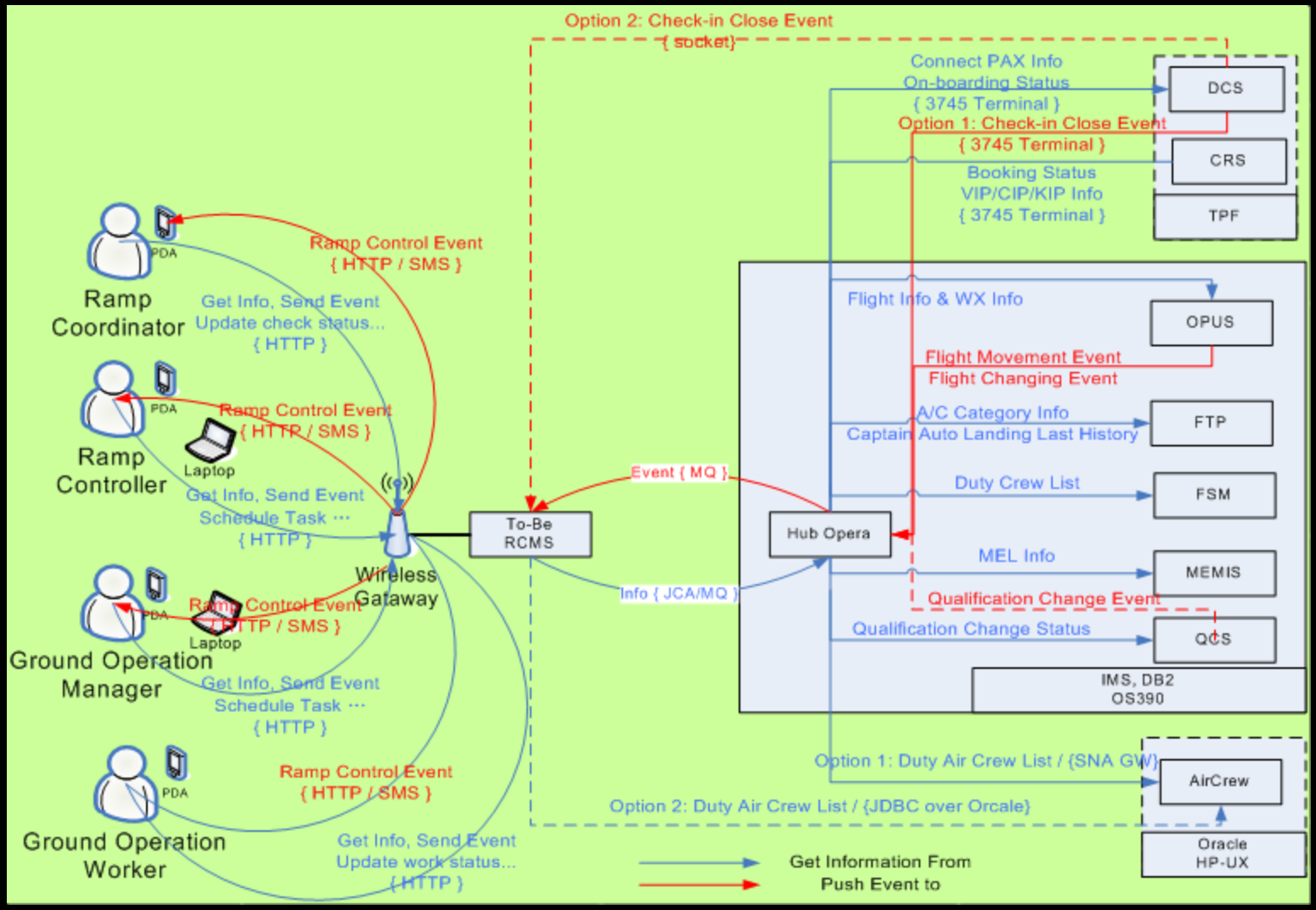
Planned SOA IT Context



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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 Weather information Flight movement and flight change event
FTP	A/C category information Captain auto landing lastest history
FSM	Cabin crew list
MEMIS	MEL info
QCS	Qualification change status
DCS	Connect PAX information On-boarding status Check-in close event
CRS	Booking status VIP/CIP/KIP information
AirCrew	Duty cockpit crew list

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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

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Prototype Demo

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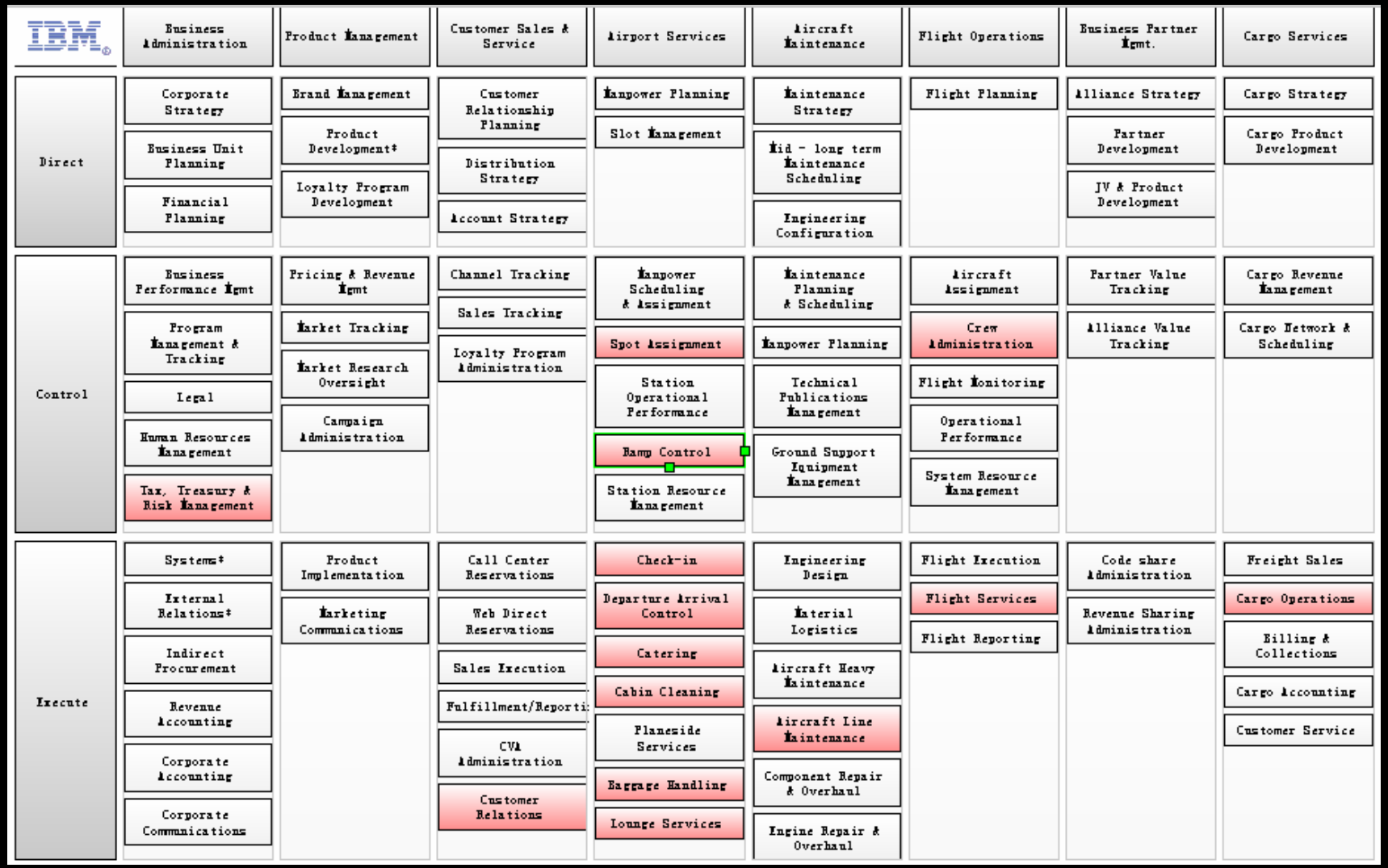
Mapping Business components for Ramp Coordination Perspective



	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/Reporti	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				

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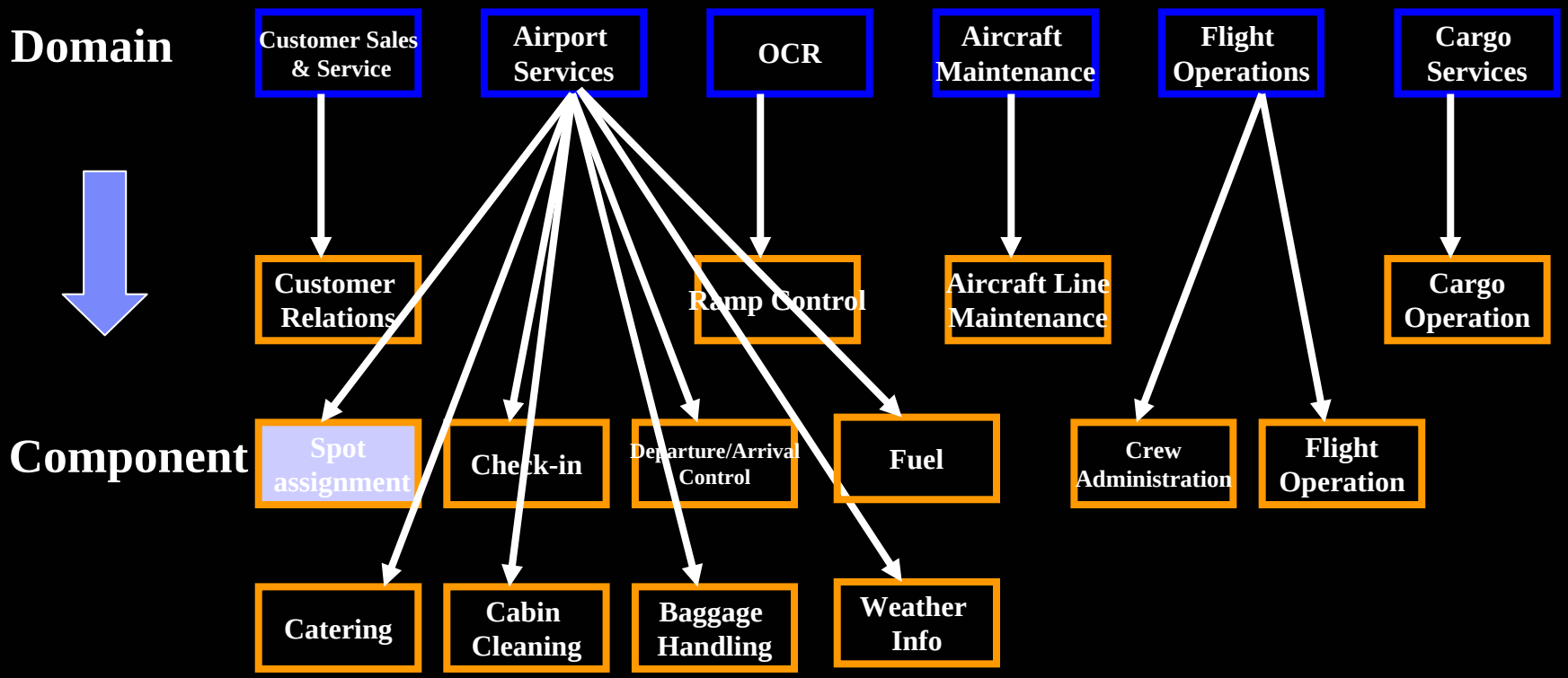
From Business Domain to Ramp Coordination Business Components



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Typical Business Process for Ramp Coordination

0 Ramp Coordination

Departure Only

Arrival Only

Short Turn Around

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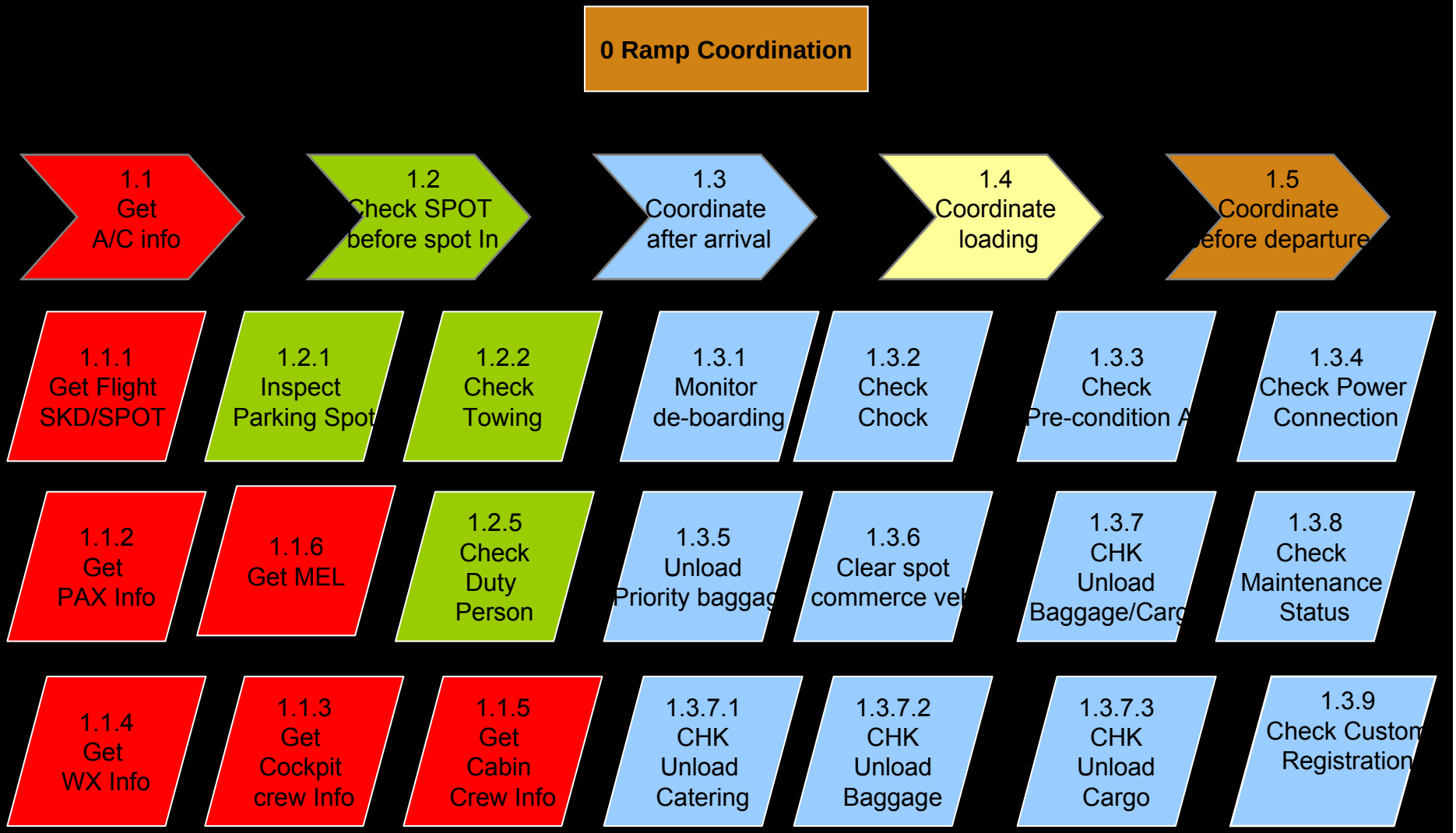
Ramp Coordination – Short Turn Around



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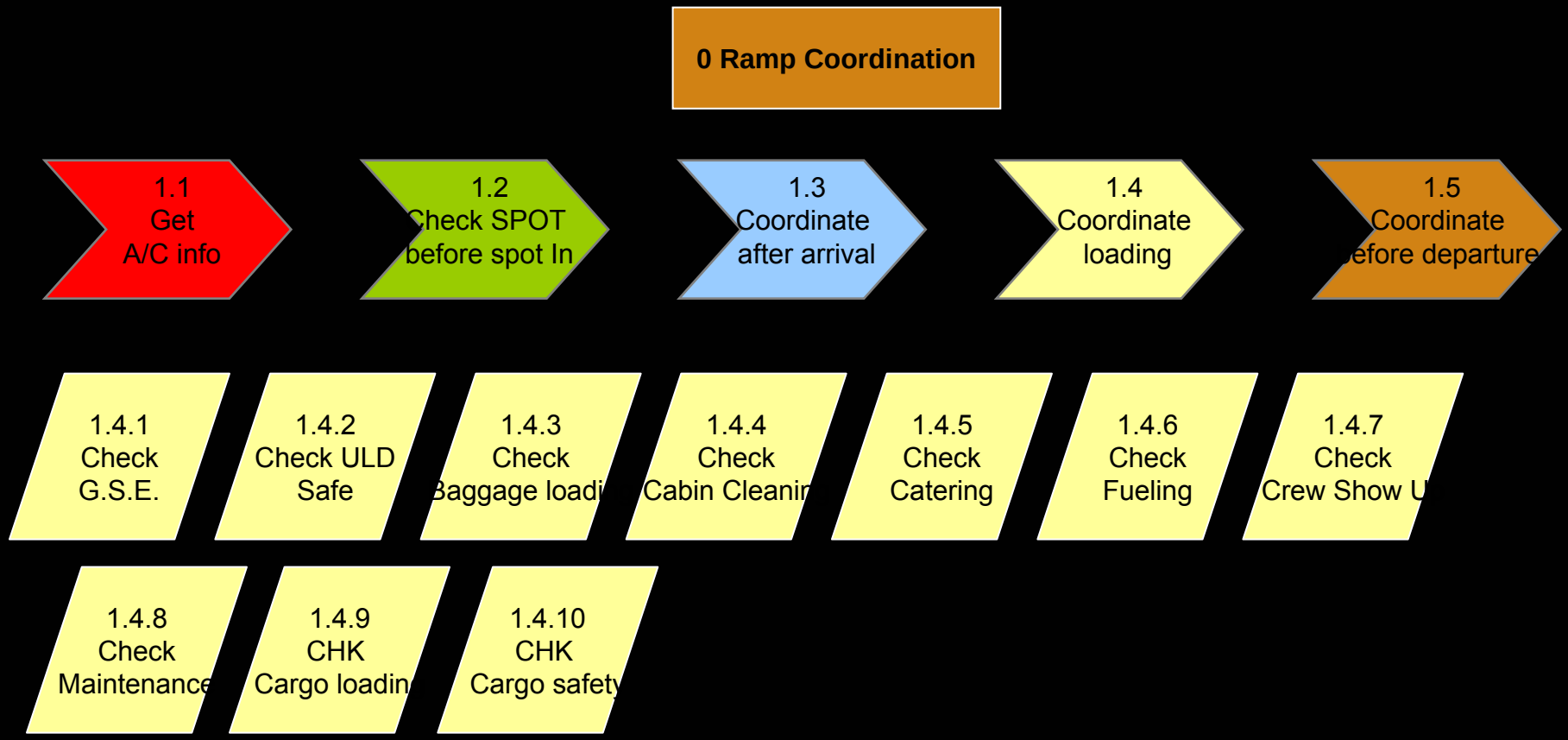
Coordinate Loading



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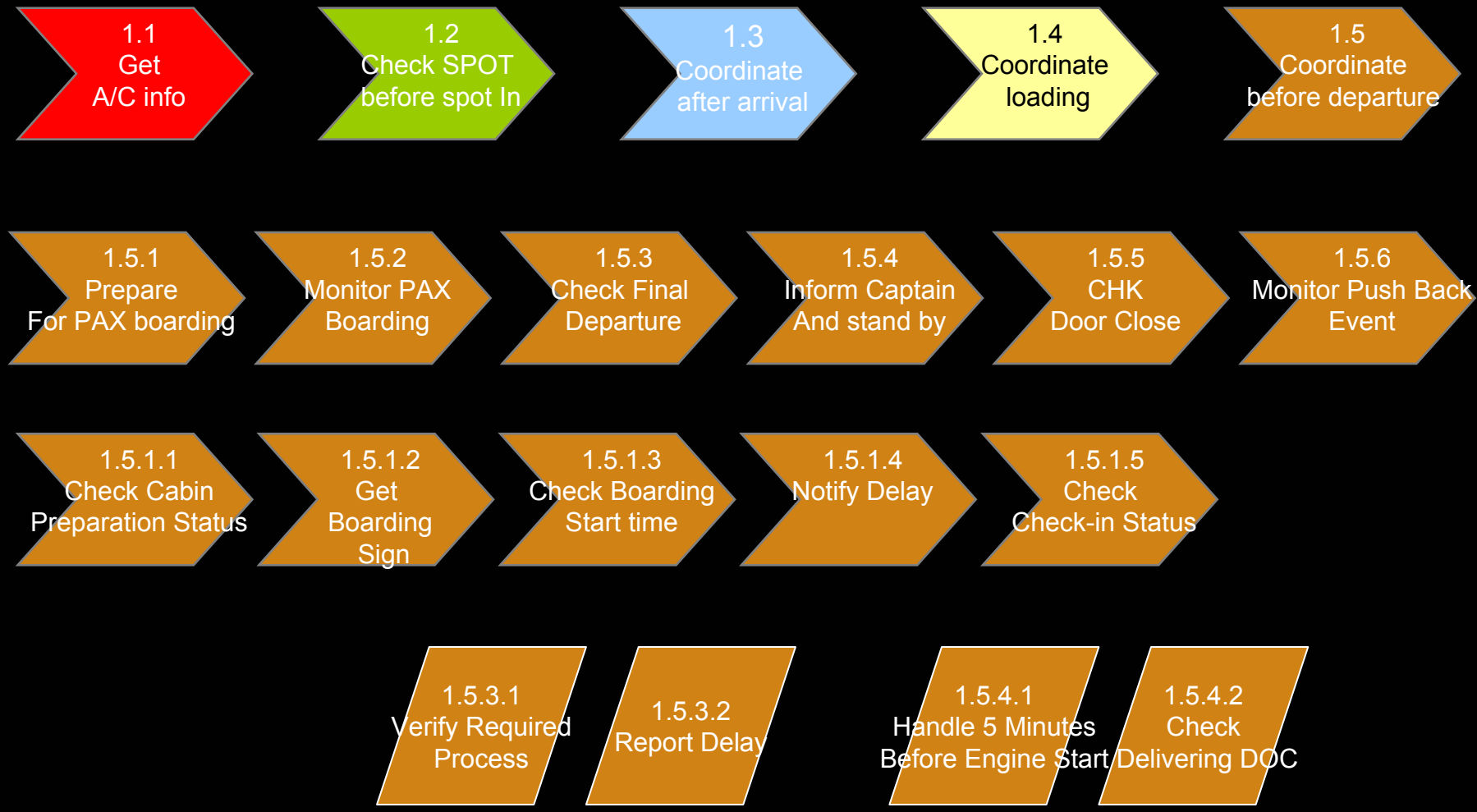
Coordinate Before Departure



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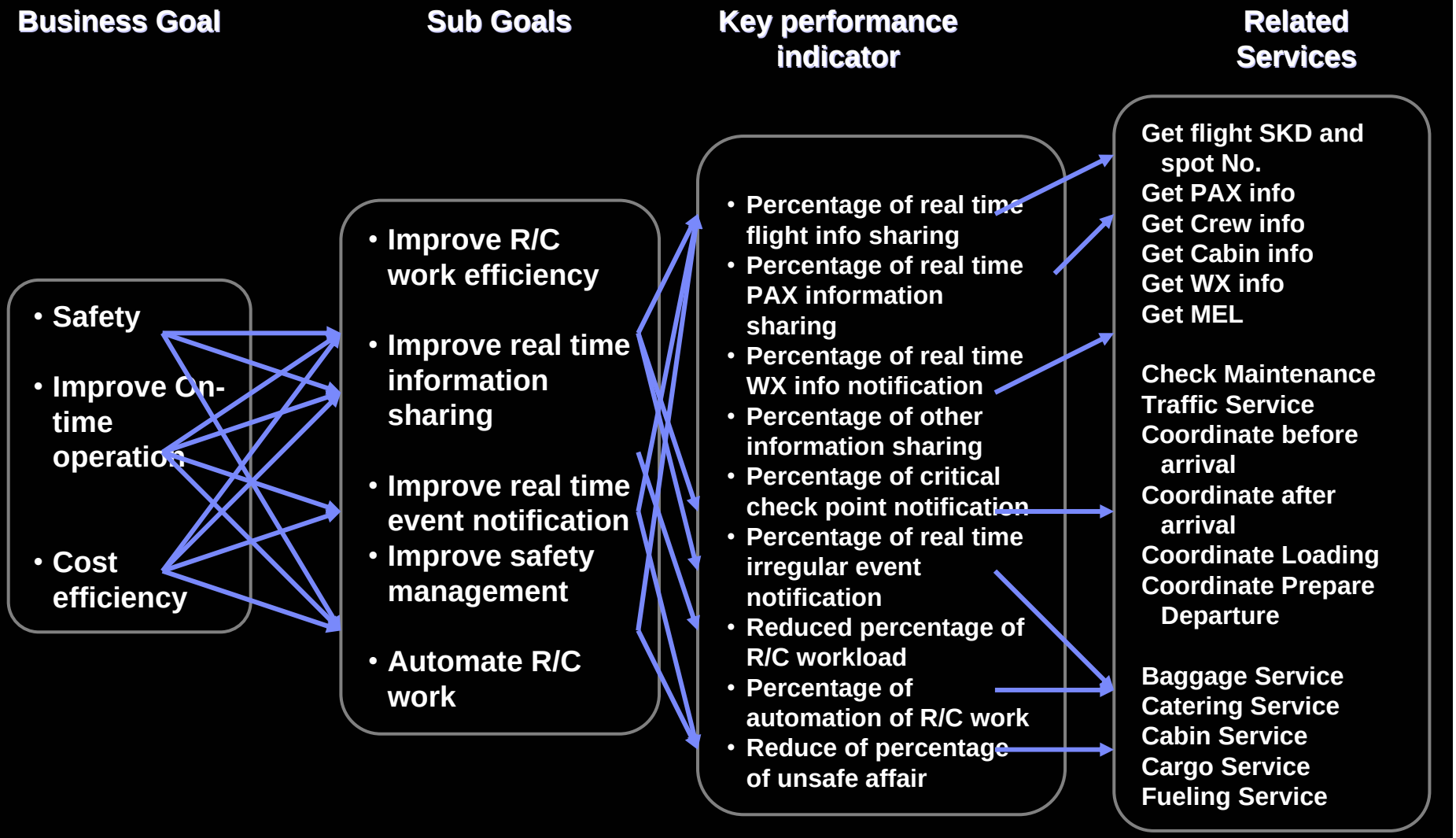
Align Service With Business Goals



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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

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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

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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

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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)

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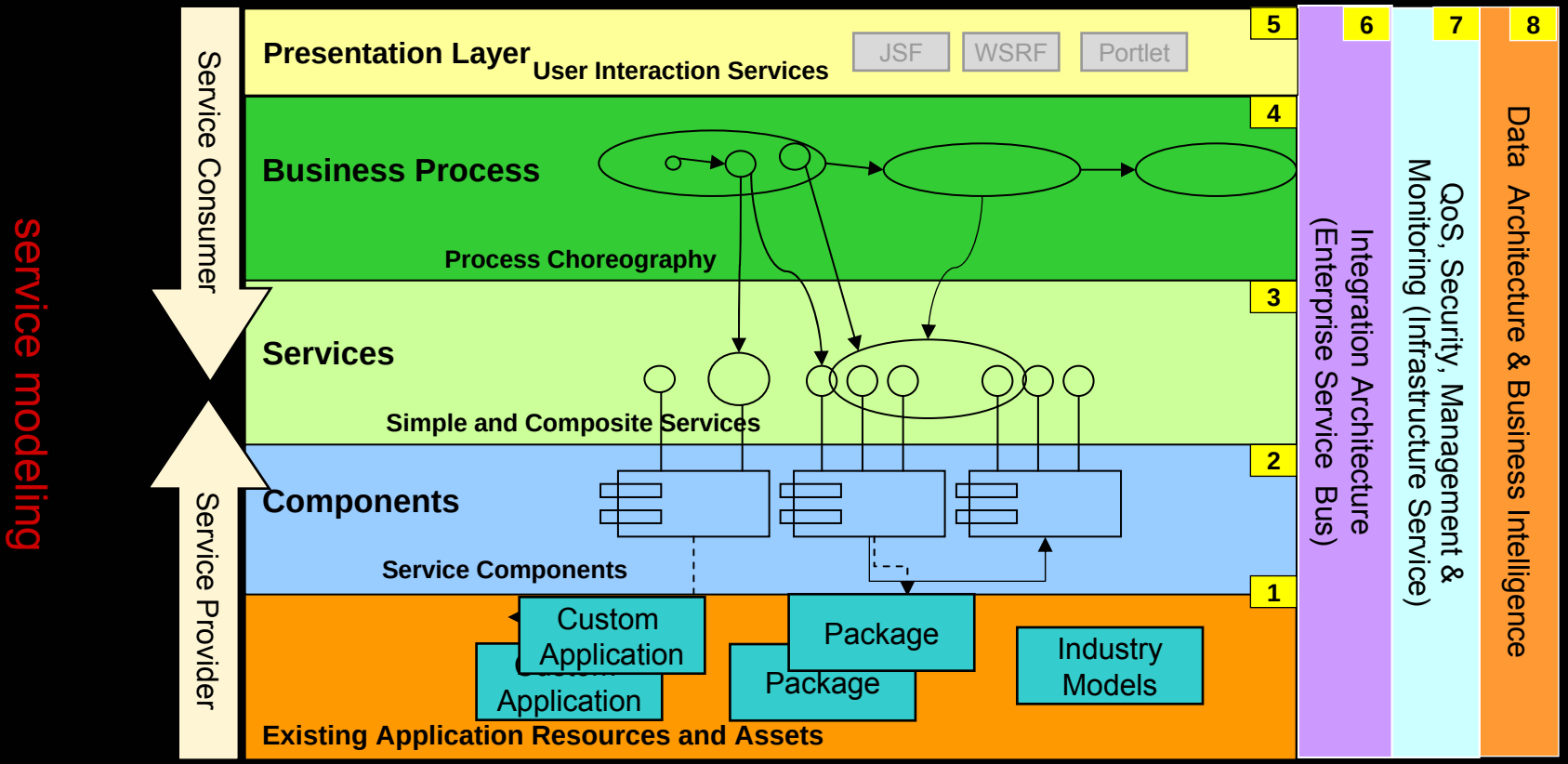
What does an SOA conceptually look like? At the heart of the SOA is the Service Model that defines services and components that realize them.

Decomposition
Separation of Concern



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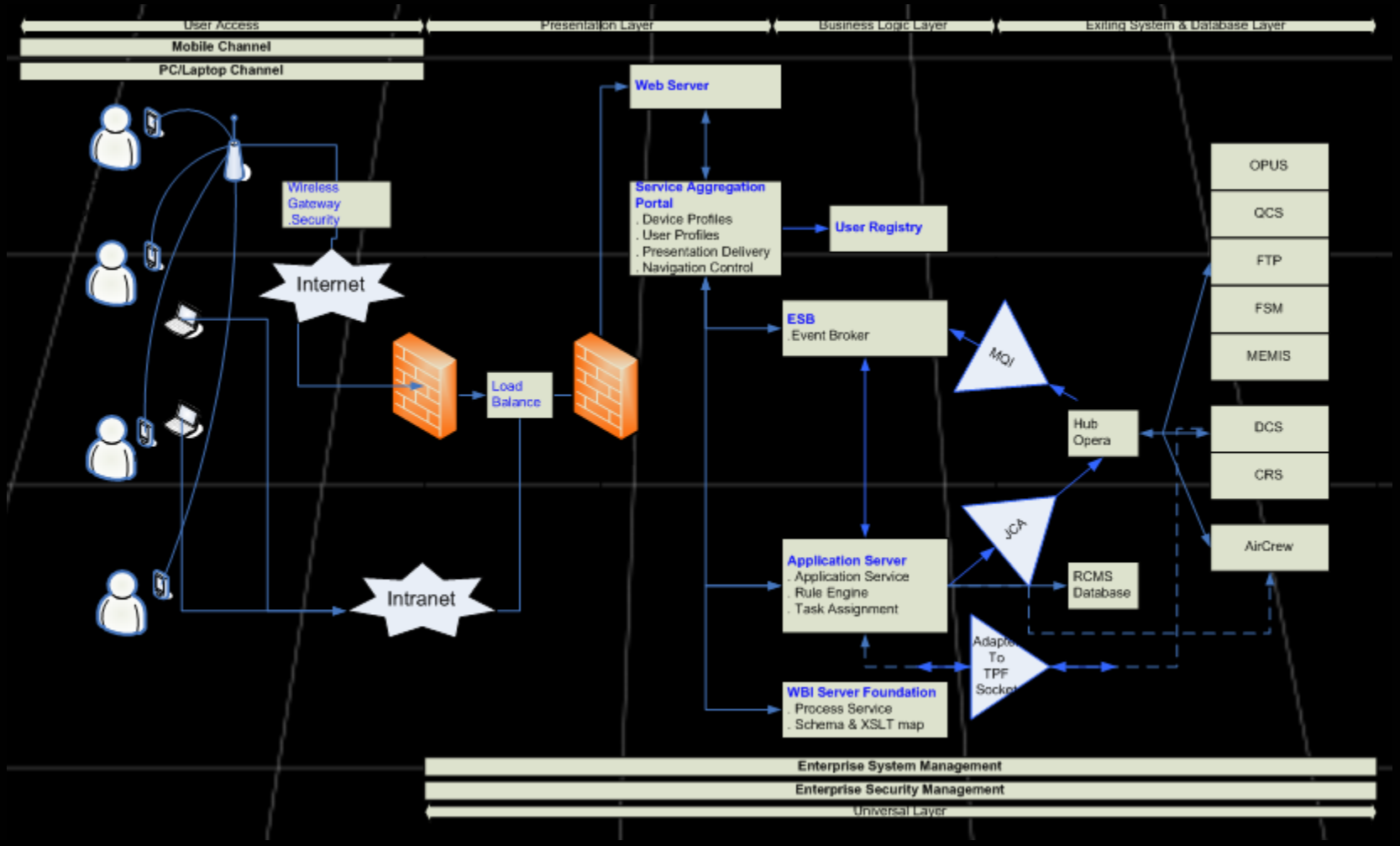
Korea Air Architecture Overview



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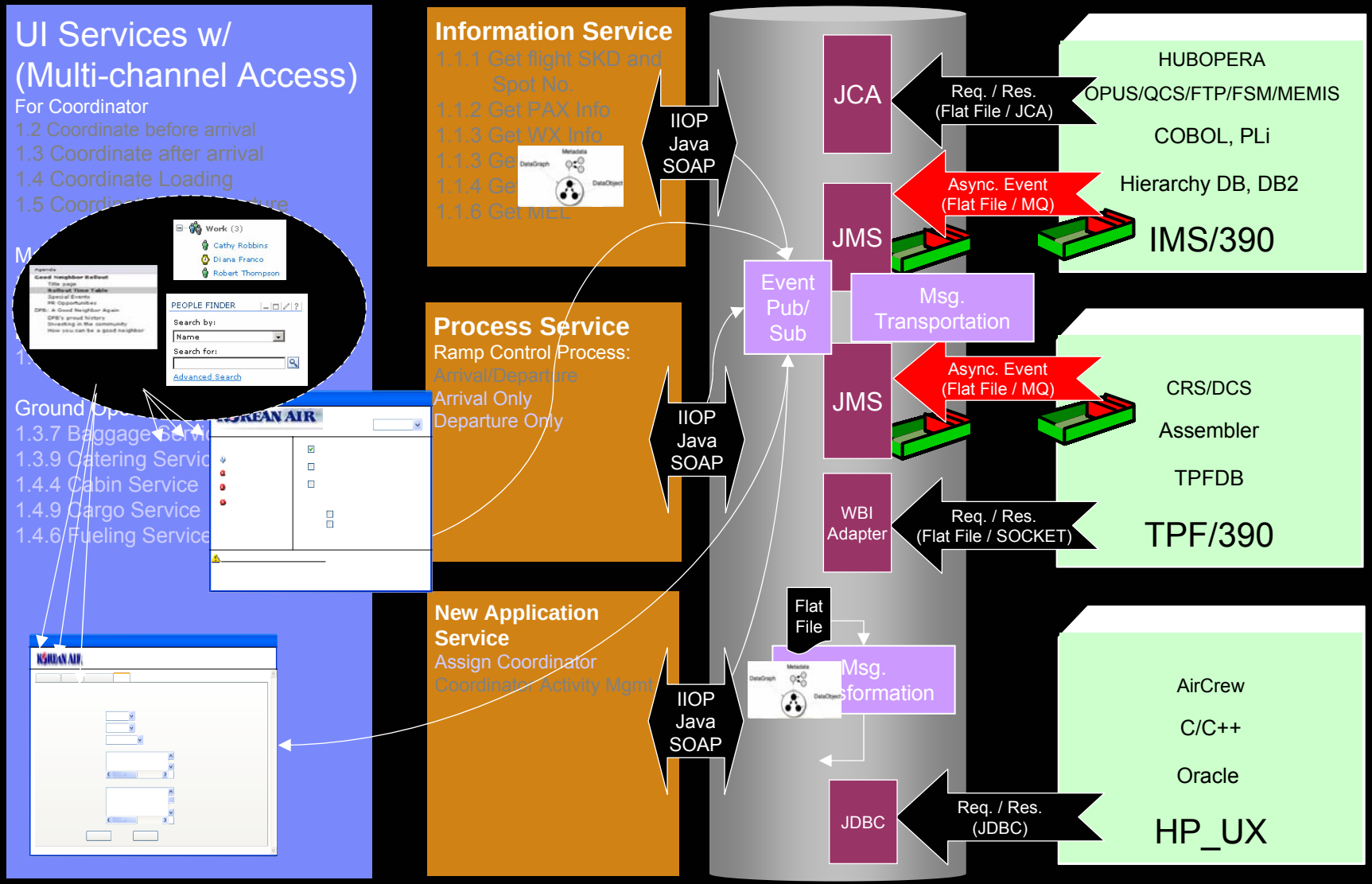
Concept View



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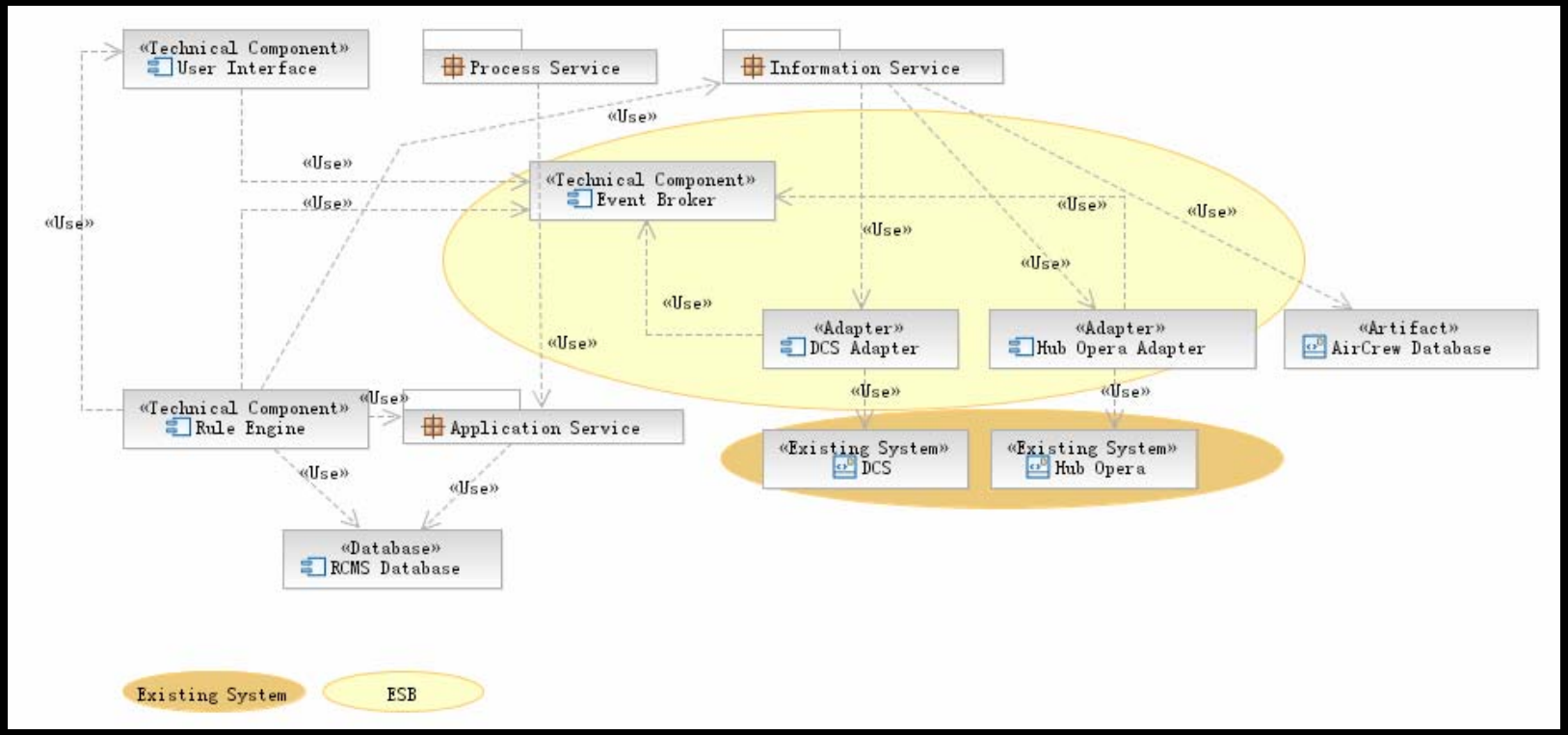
Components



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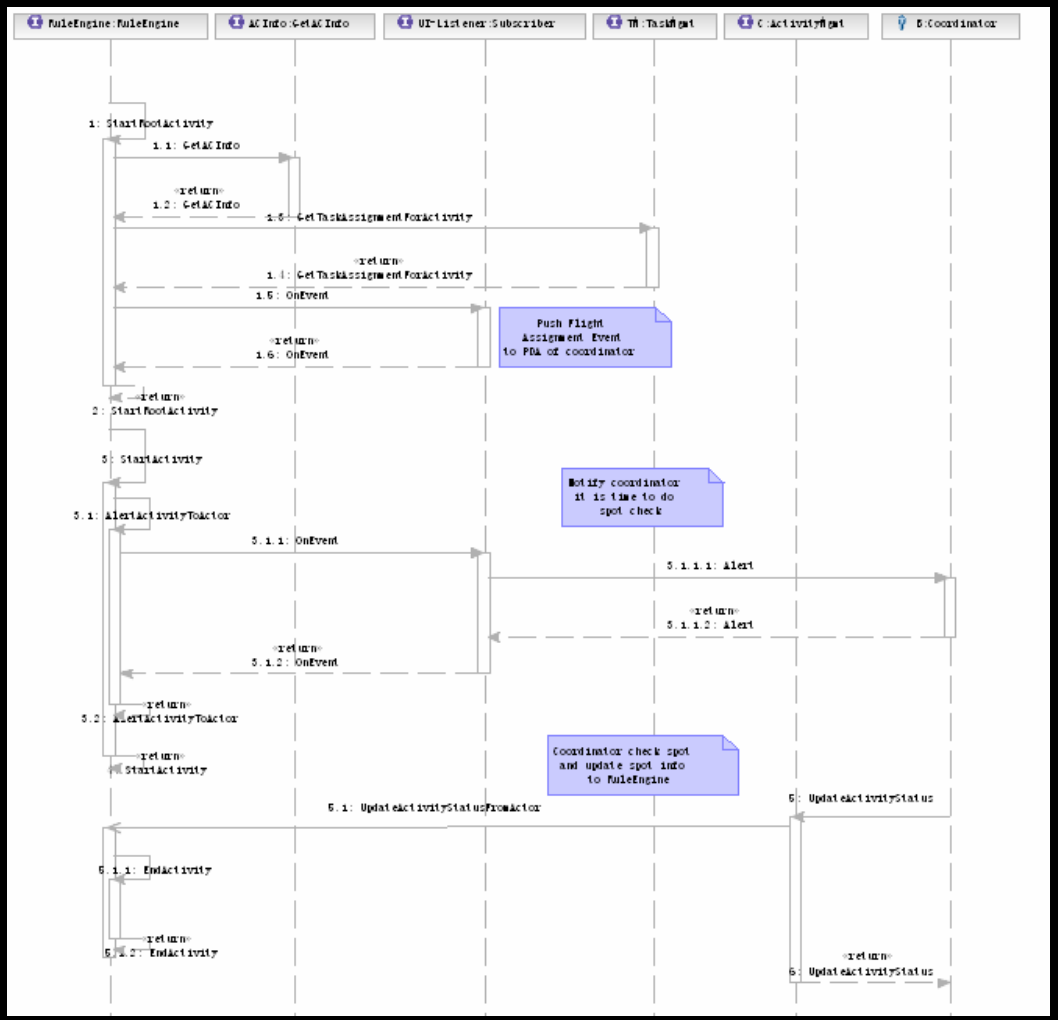
Sequence Flow



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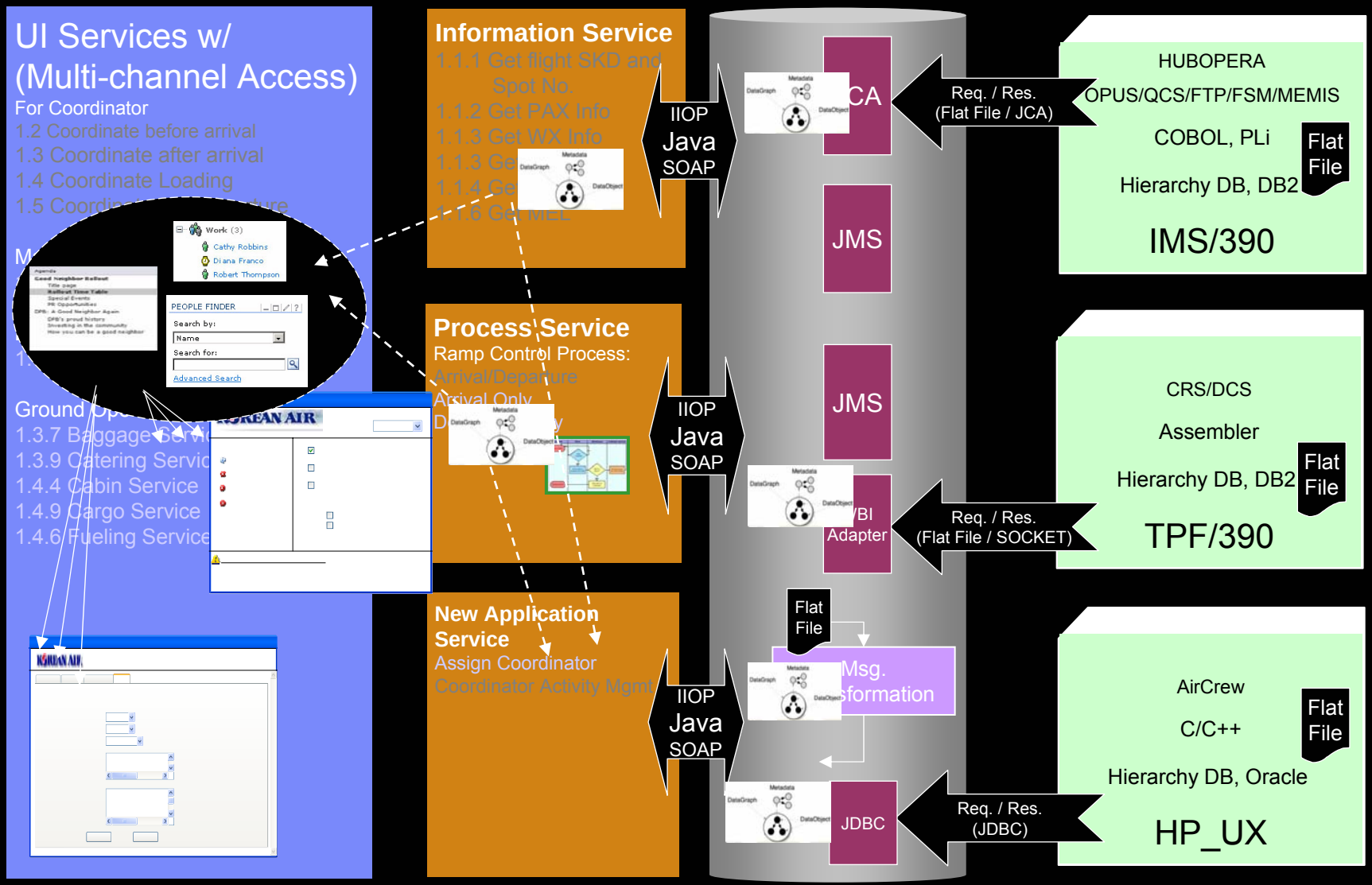
How real-time information sharing and event notification are supported



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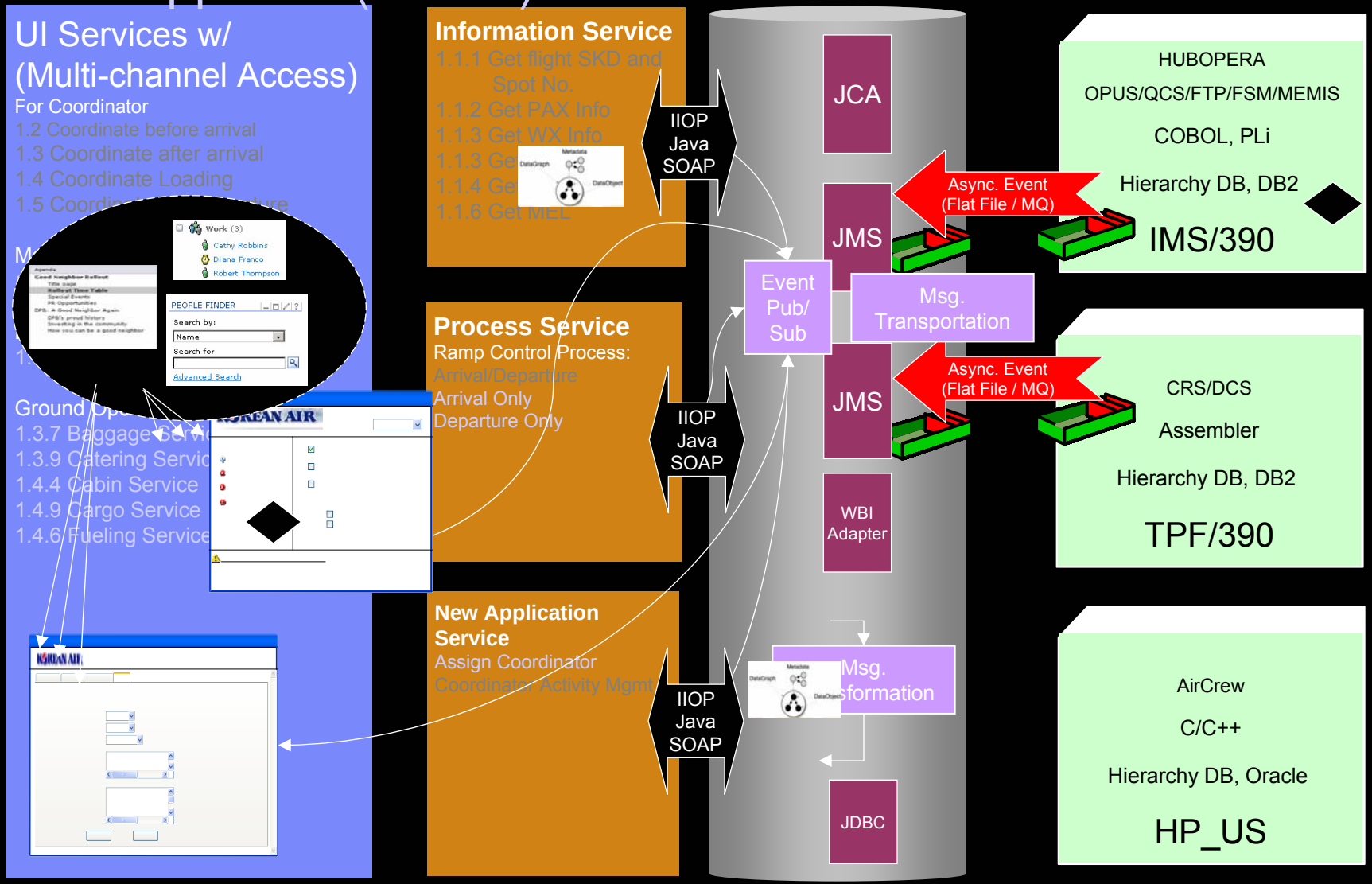
How real-time information sharing and event notification are supported (Cont'd)



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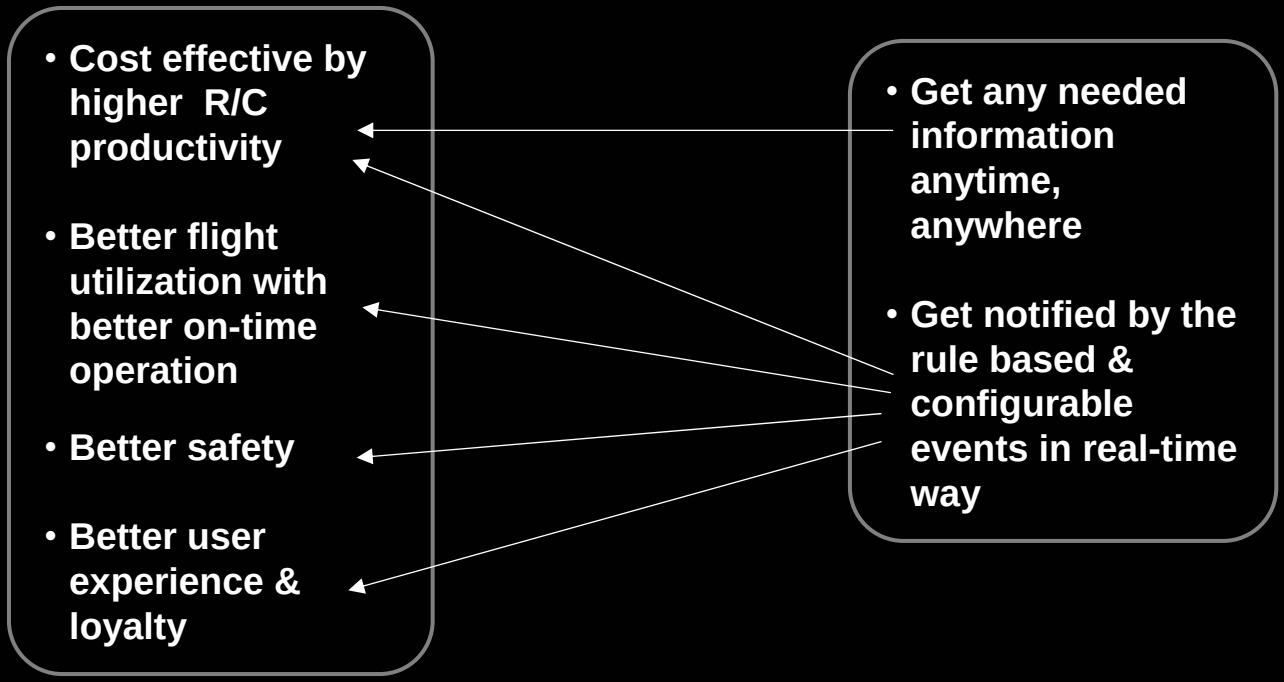
Why it is aligned with "ramp control" business goals



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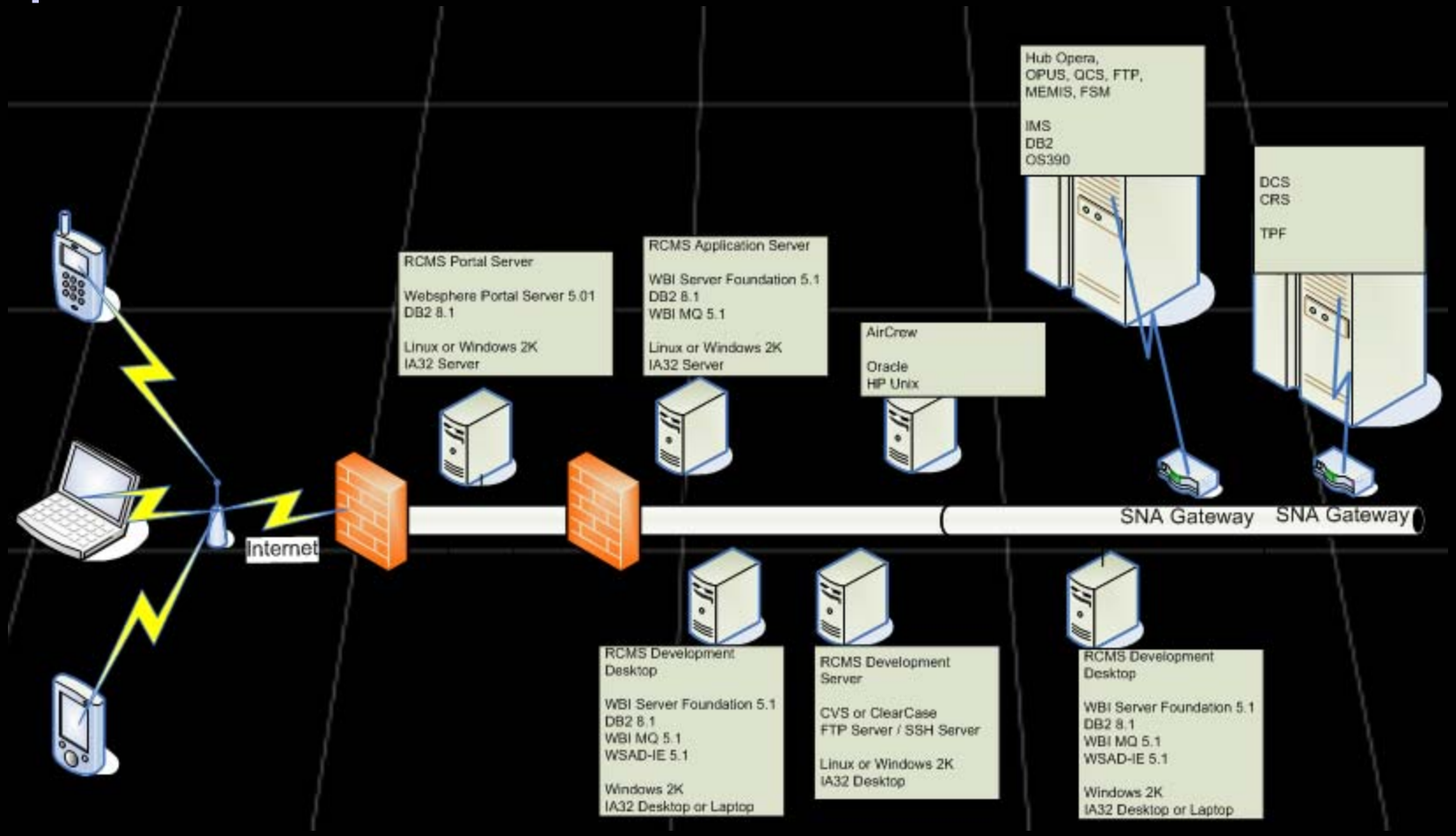
Operation Model



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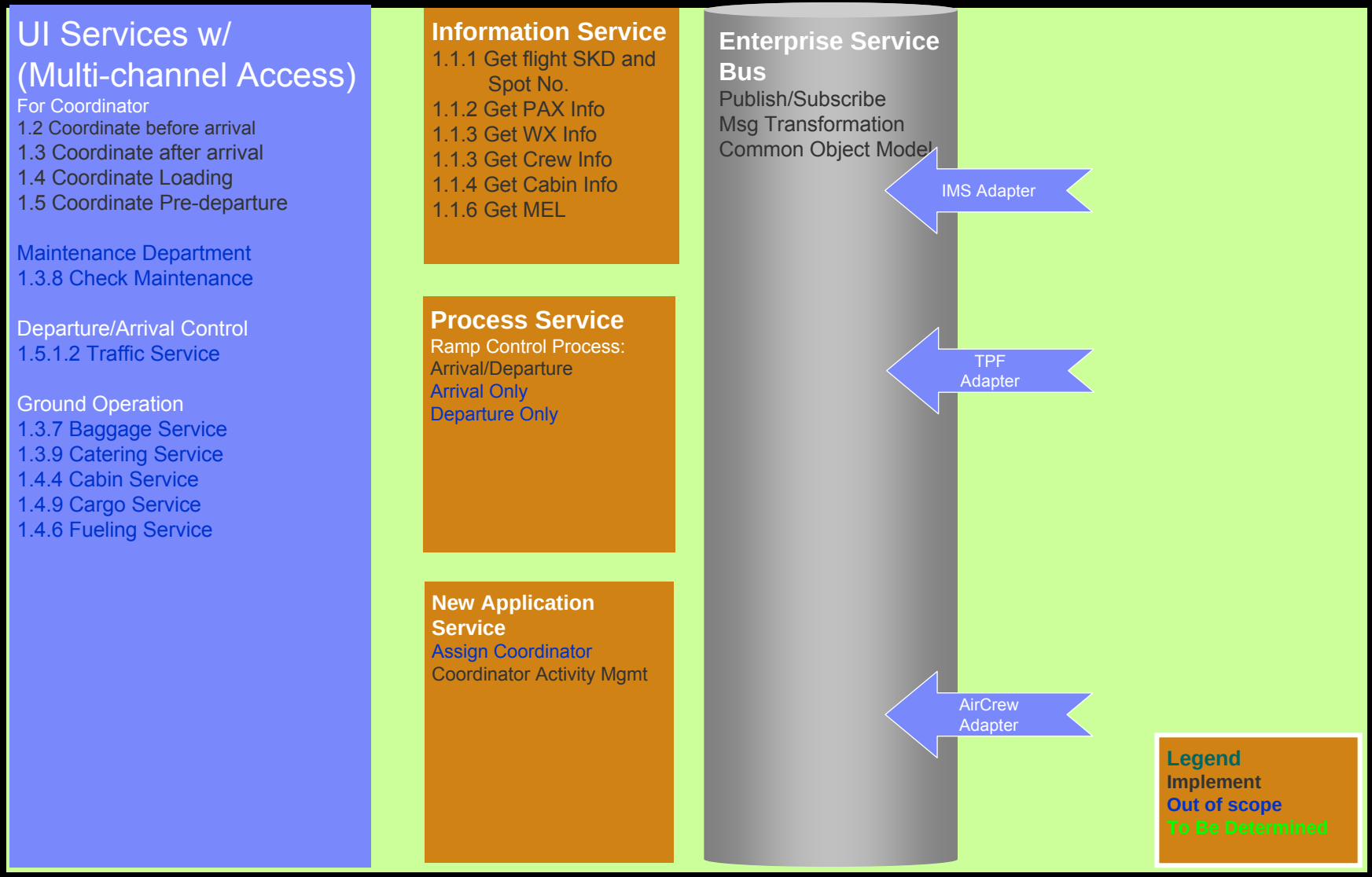
The Deliverables of the "KAL First Step"



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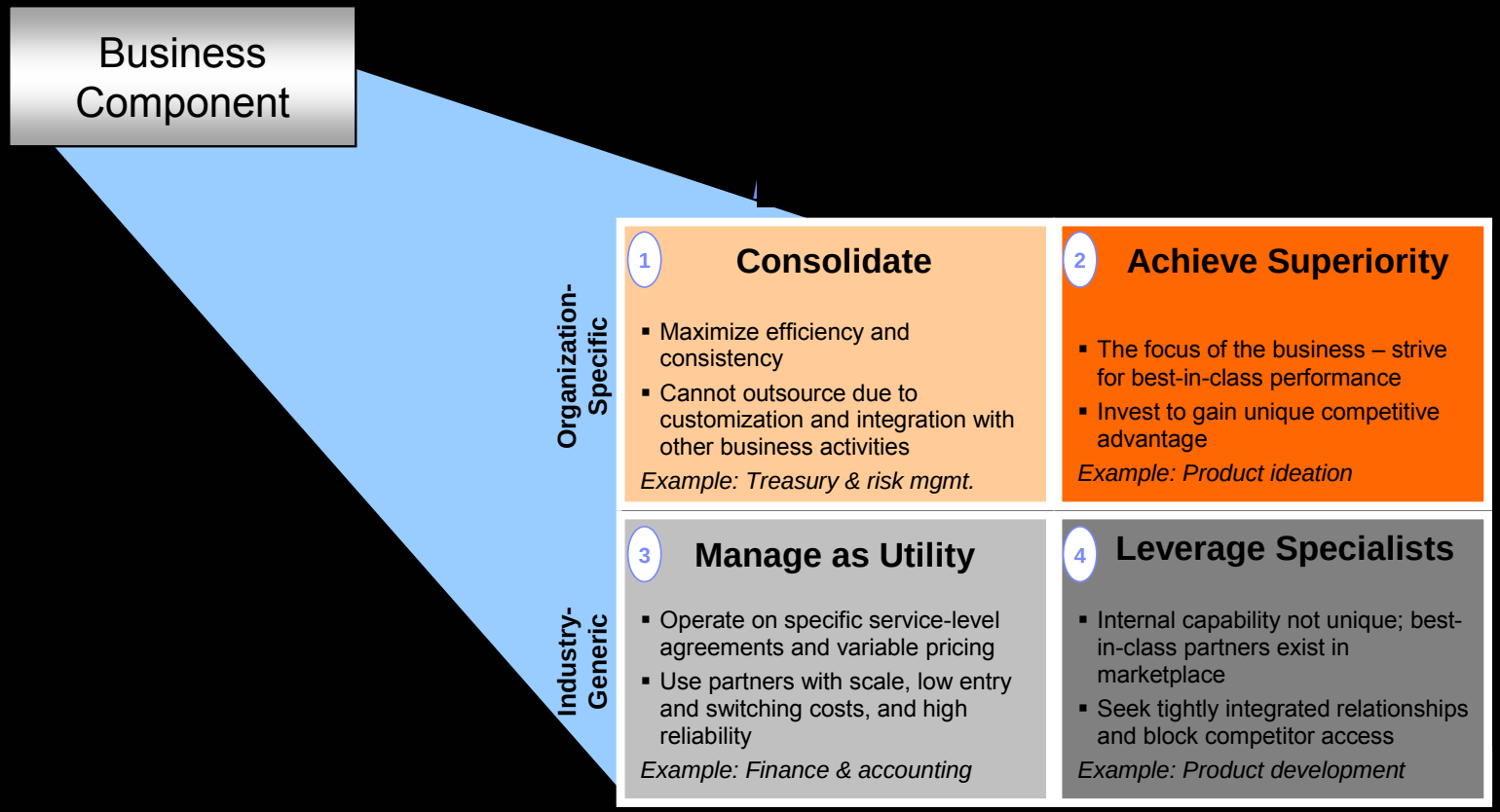
The IBM Componet Business modeling is used to refine an operating model to support a business vision



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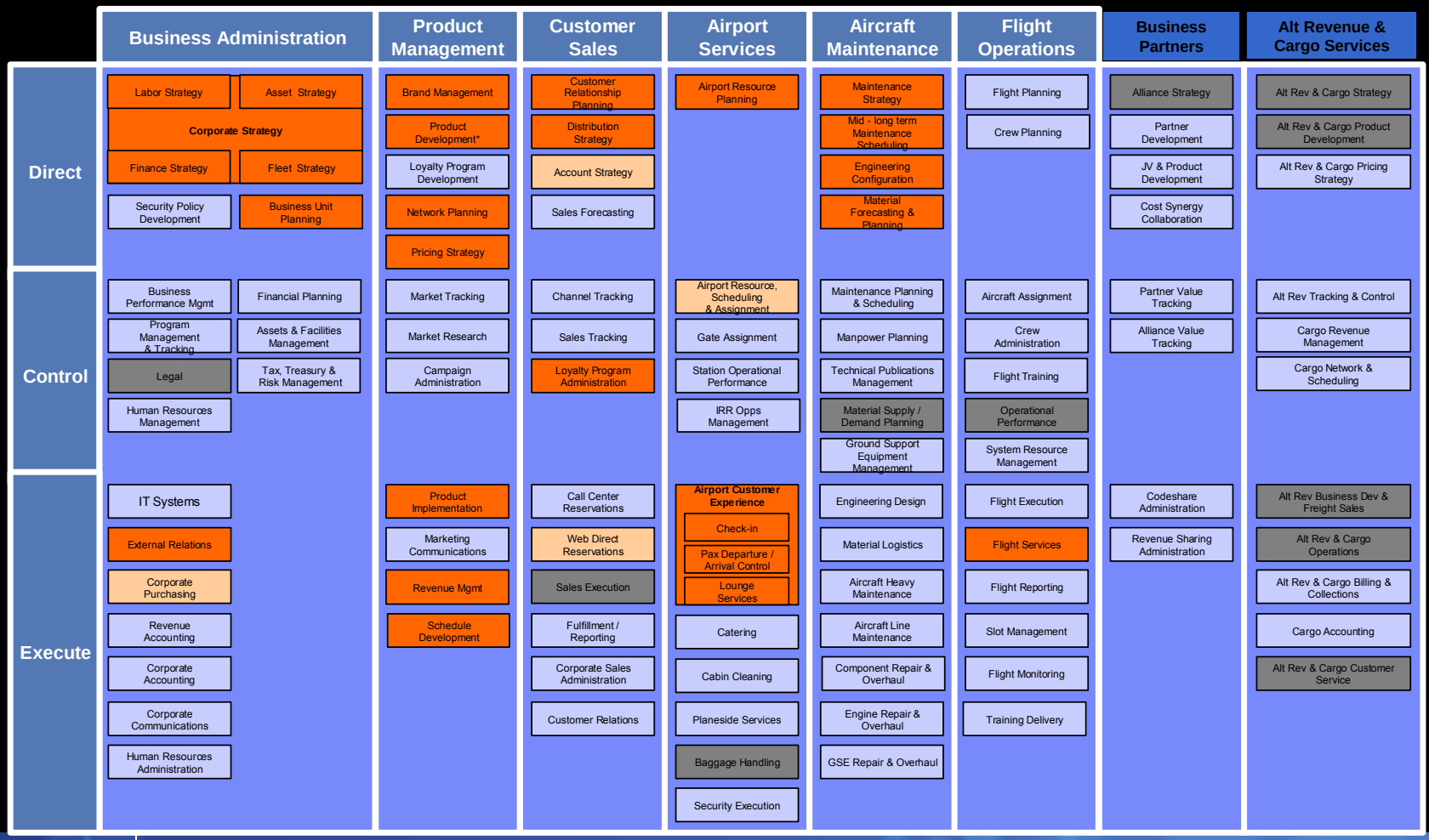
By using the Component modeling framework an organization can identify areas that create sustainable value

Airline CBM – Component Operating Model

ILLUSTRATIVE

Consolidate | Achieve Superiority | Manage As Utility | Leverage Specialists



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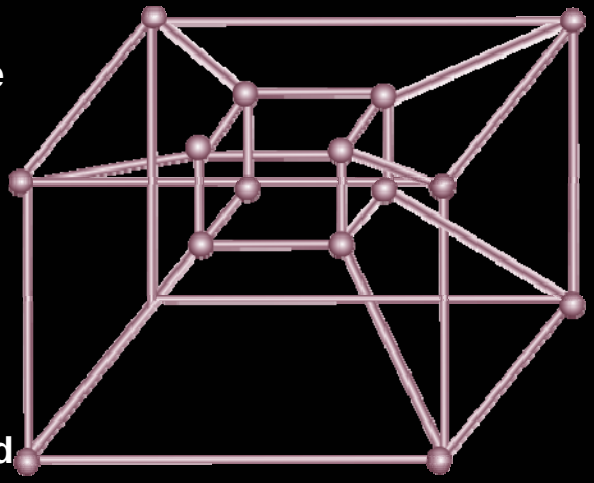
Service or Asset Transformation Needs to be Incremental…Controlled

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

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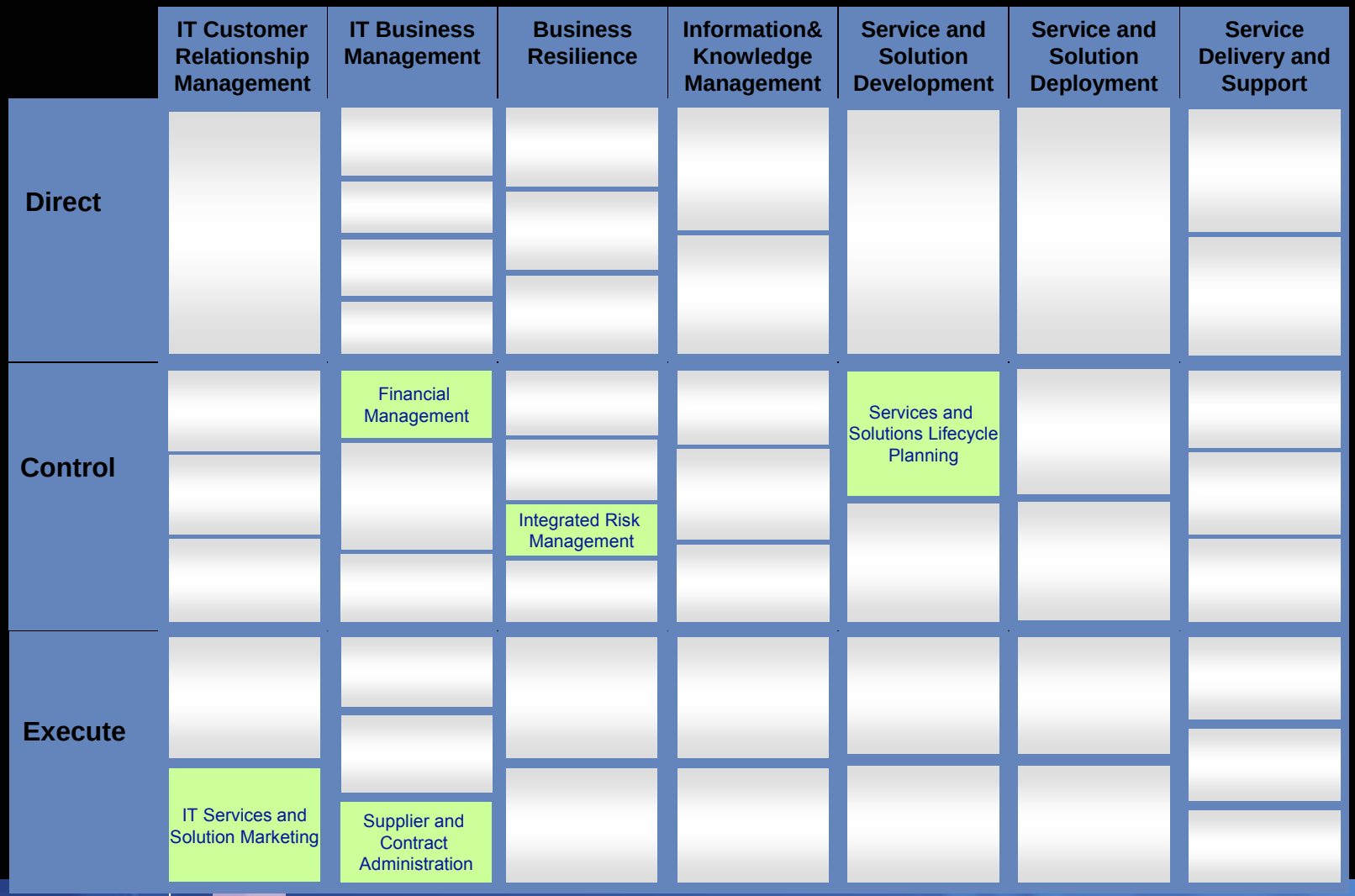
Business domains and business components related to Opportunity Management System



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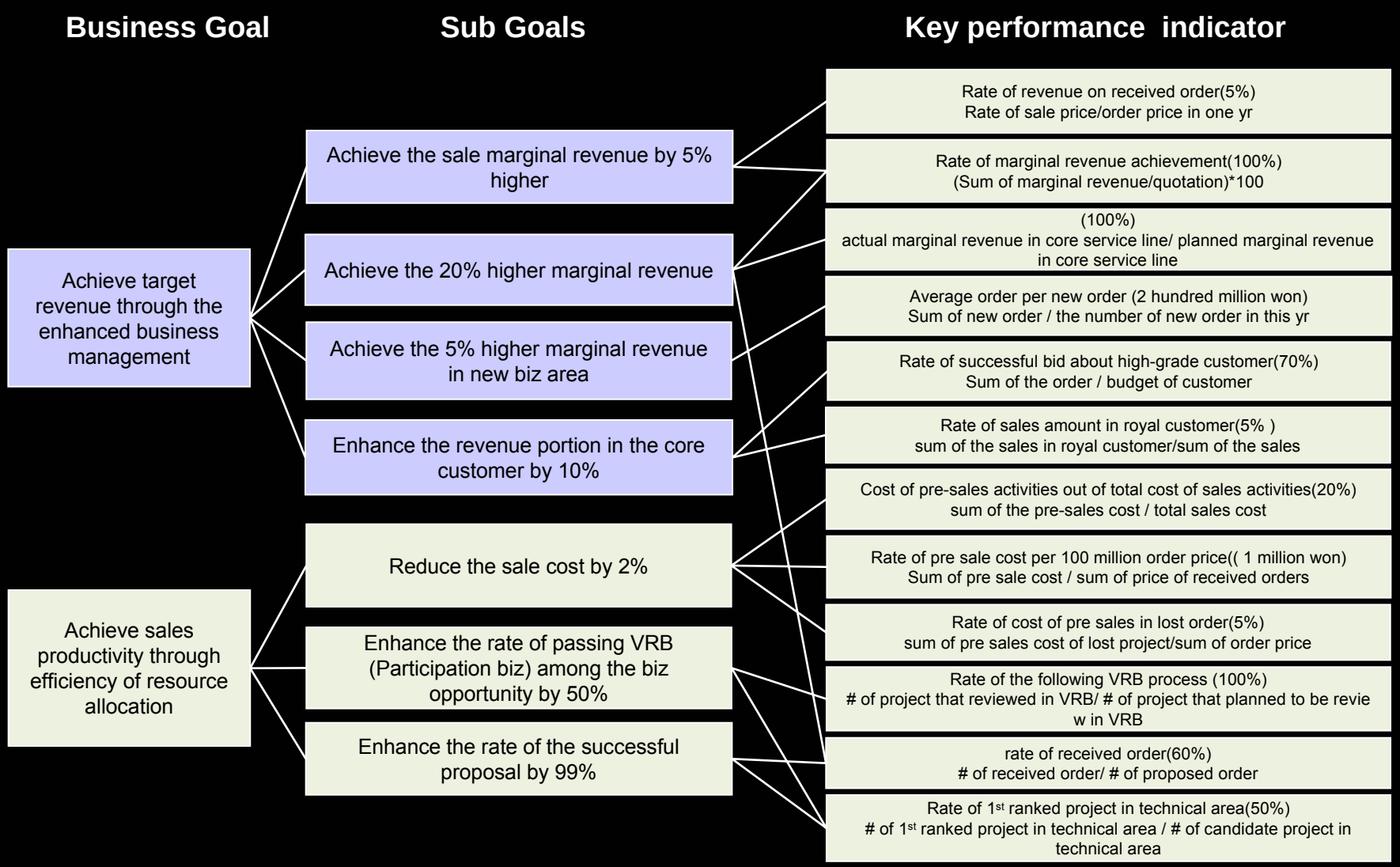
Defined Business Goals



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Business Process for Opportunity Management

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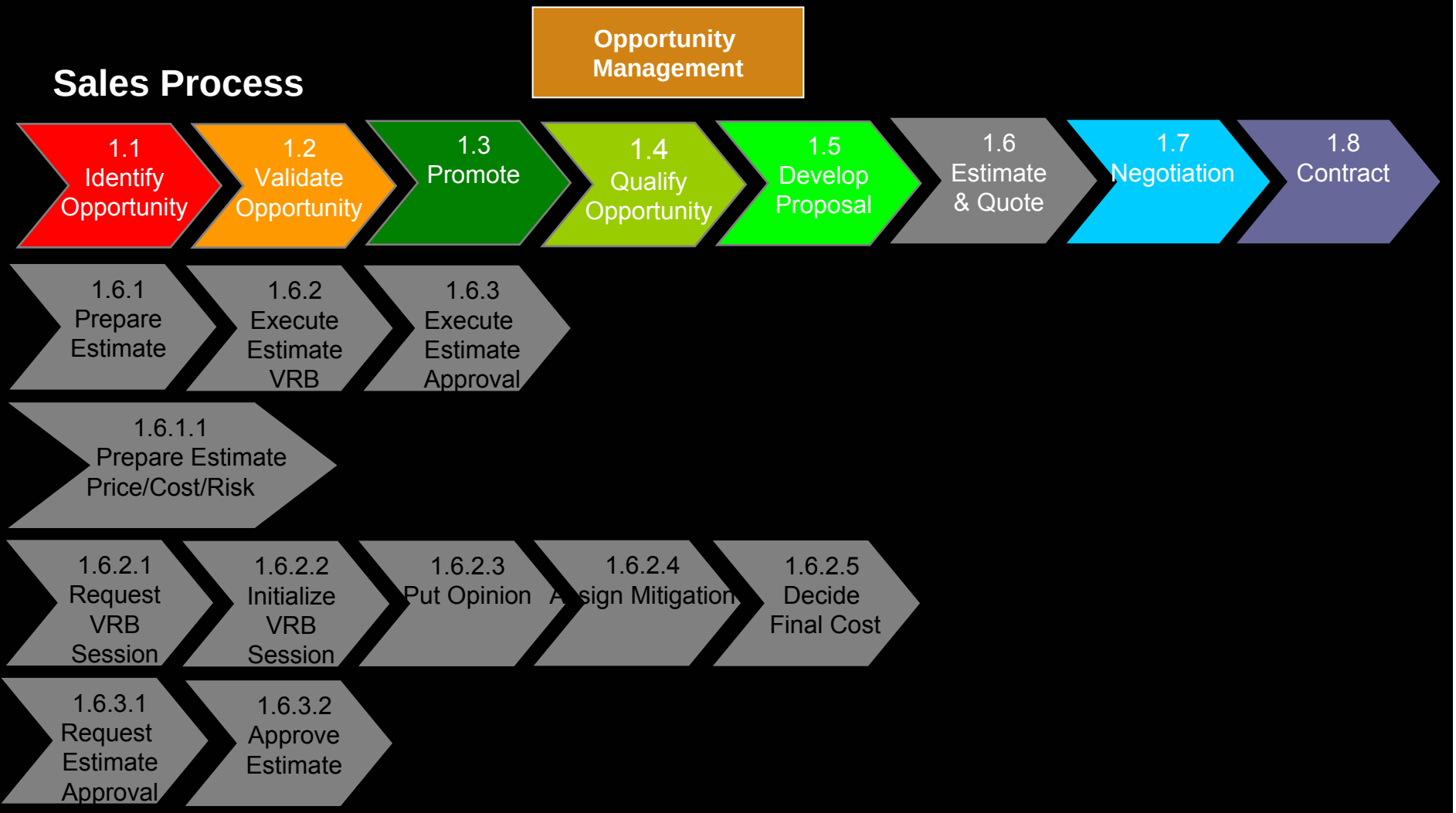
Detailing the Estimate & Quote process



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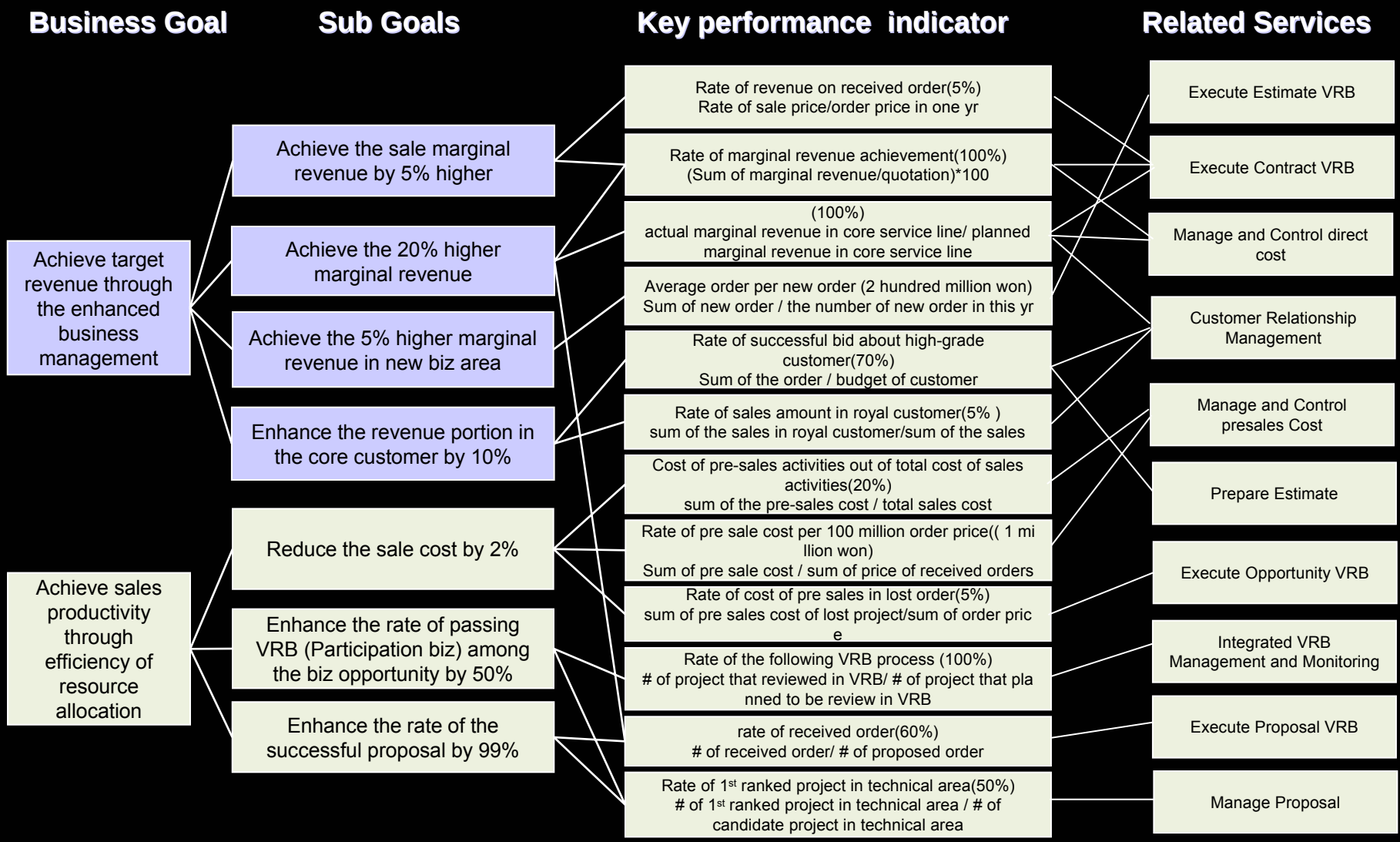
Align Service With Business Goals



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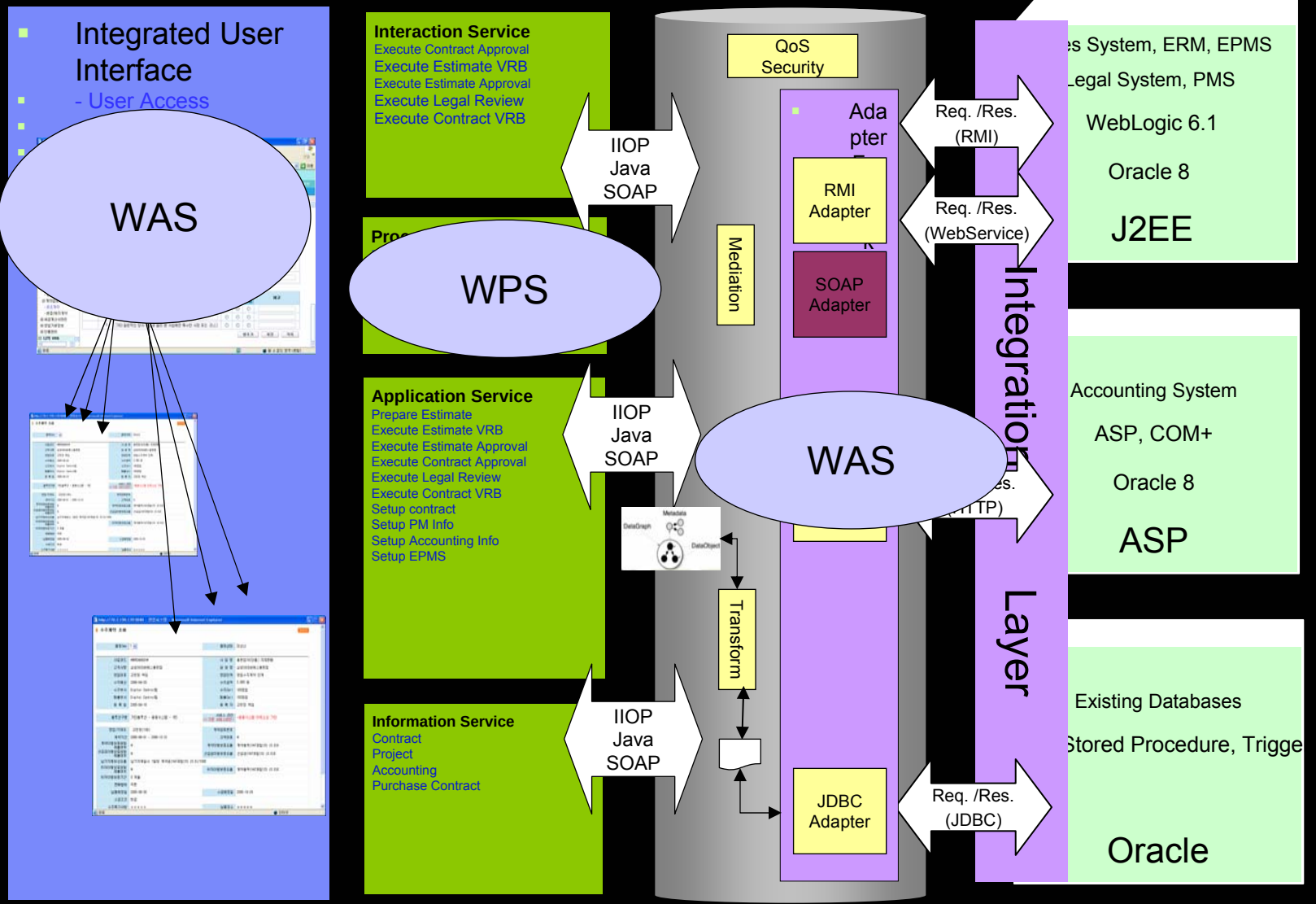
Services Implementation



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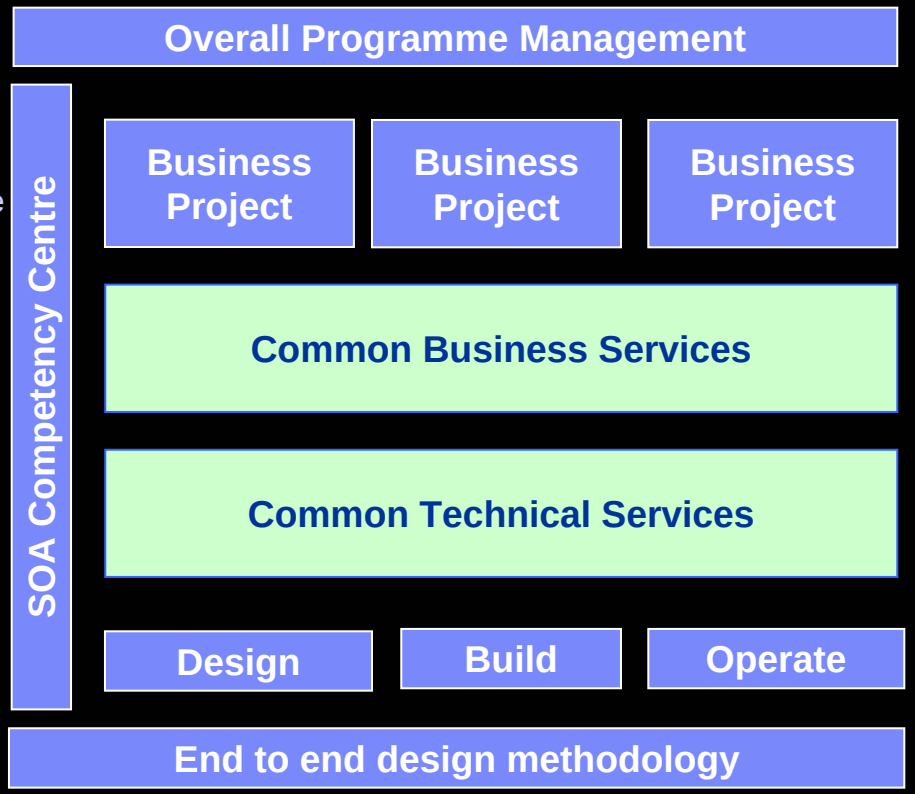
For SOA to succeed, it is a REQUIREMENT that a convergence around organizational models occurs. This must be put in place first.

- 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



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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/adopt 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

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Hindi

Traditional Chinese

Thai

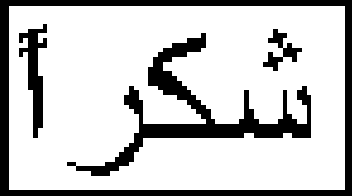
Russian

Gracias

Spanish

Merci

French



Arabic

Obrigado

Brazilian Portuguese

Thank You

English

Danke

German

Simplified Chinese

Grazie

Italian

Tamil

Japanese

Teşekkürler

turkish

Korean

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