Hooking Business Process Management into your Integration Architecture
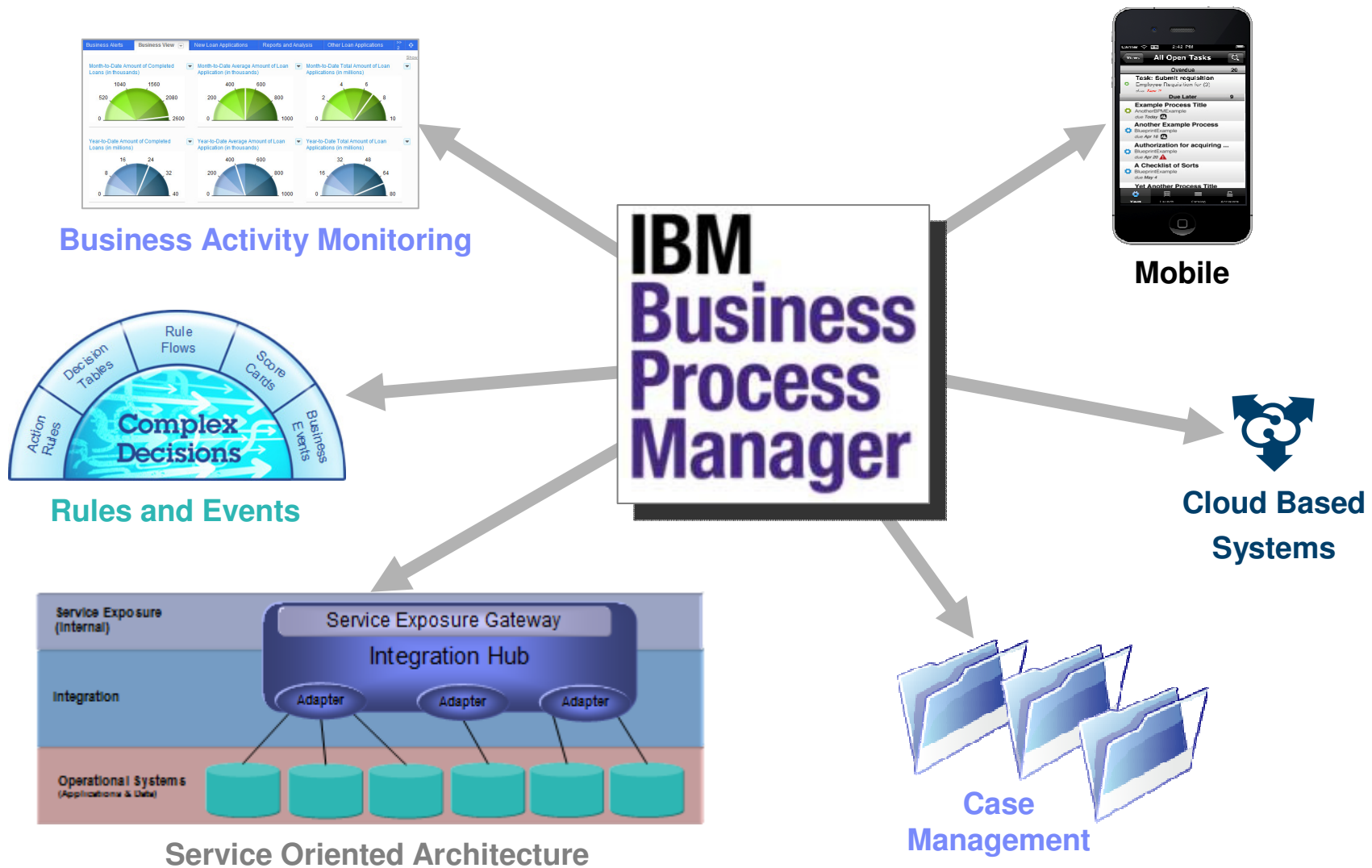
**WebSphere Integration
User Group 2014**

Kim Clark

*BPM, Integration
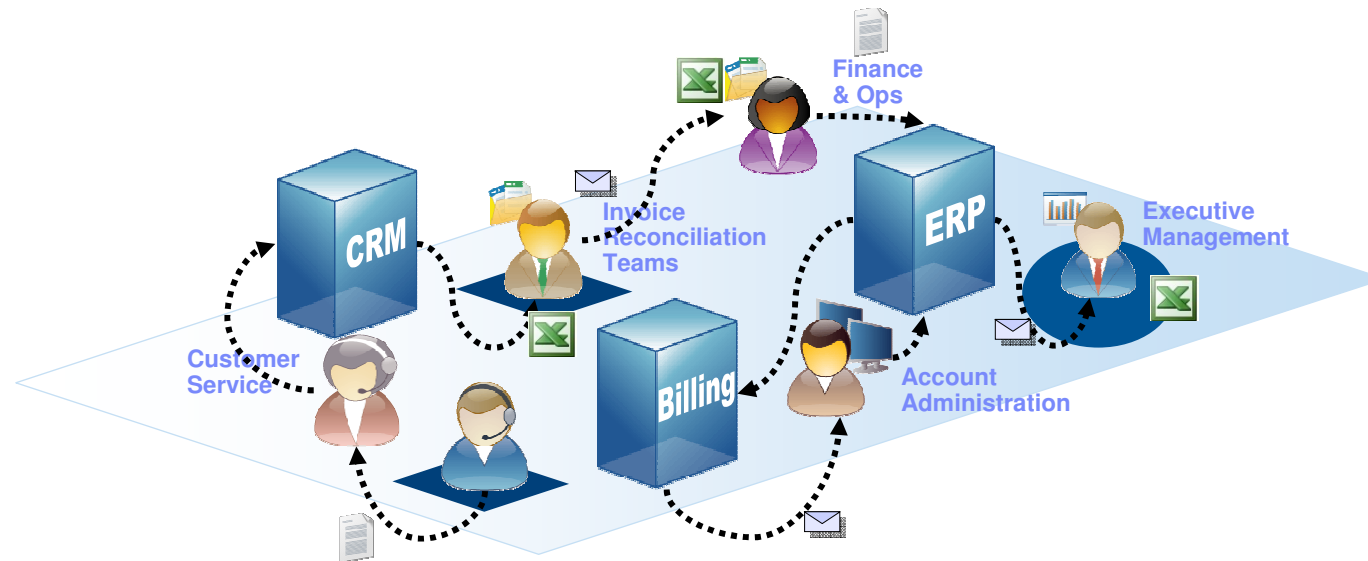and SOA Specialist
kim.clark@uk.ibm.com*

Hooking Business Process Management into your Integration Architecture

Business Activity Monitoring

Rules and Events

Service Oriented Architecture

IBM Business Process Manager

Mobile

Cloud Based Systems

Case Management
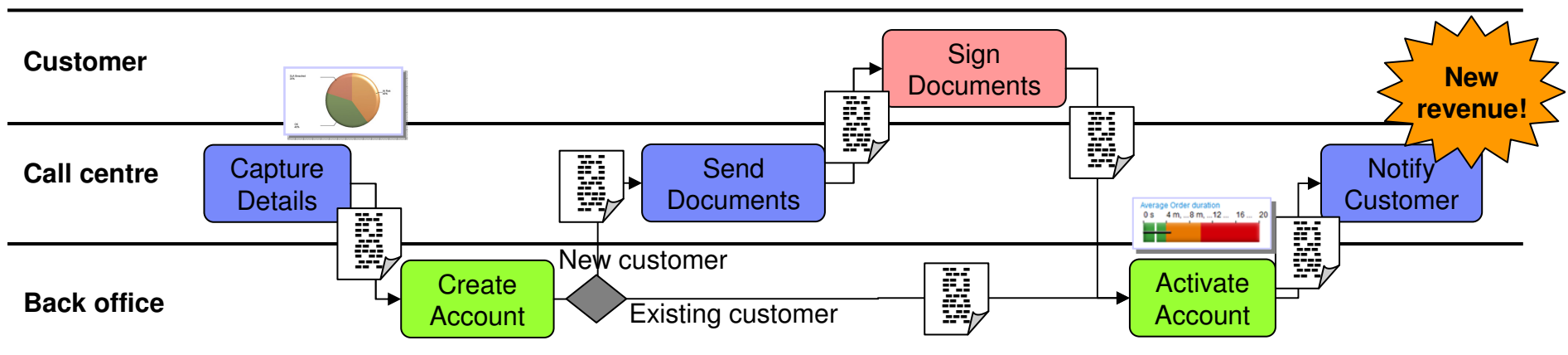
An unmodelled process

- What tasks are being done?
- Who is doing them?
- How do we know who's next?
- Will we finish on time?
- How can we manage priorities?

- Knowledge is reliant on individuals
- Restructuring is the process hard
- Re-training is painful
- Management information is a burden
- Data duplication is inevitable
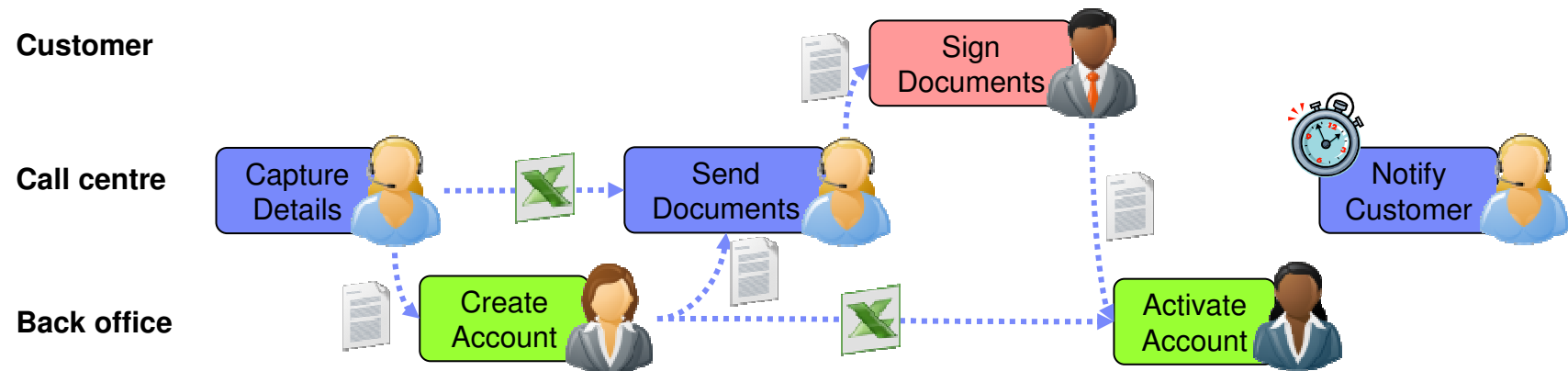- Data integrity is poor

What makes a business process suitable for BPM?

- Performing the process provides **value to the business**
- The process contains **individually business relevant steps**
- **Business relevant data** flows through the process

- The process follows a relatively **structured path**
- The steps within the process are performed by **multiple roles/teams**.
- The process **changes over time** as a result of changes in the business

Customer		Sign Documents
Call centre	Capture Details	Send Documents
Back office	Create Account	Activate Account

New customer

Existing customer

Notify Customer

New revenue!

Goals of process optimisation

Customer				Sign Documents		
Call centre	Capture Details		Send Documents			Notify Customer
Back office		Create Account			Activate Account	

- Maximise high value staff
- Increase volumes
- Meet performance targets
- Improve user experience
- Meet compliance requirements

- Make better informed decisions
- Improve business agility
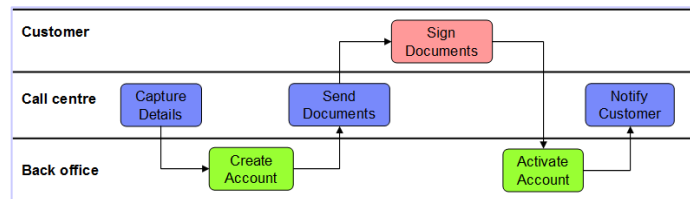- Reduce headcount
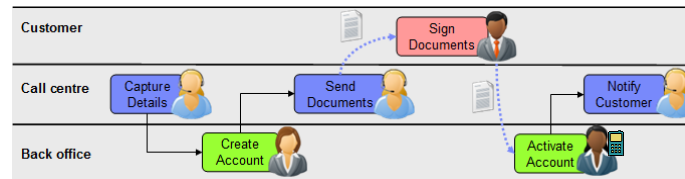- Improve data quality

Progressive process optimisation
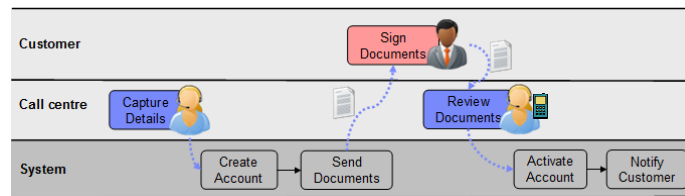
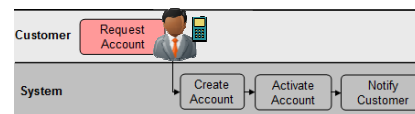Unmodelled process

Modelled process
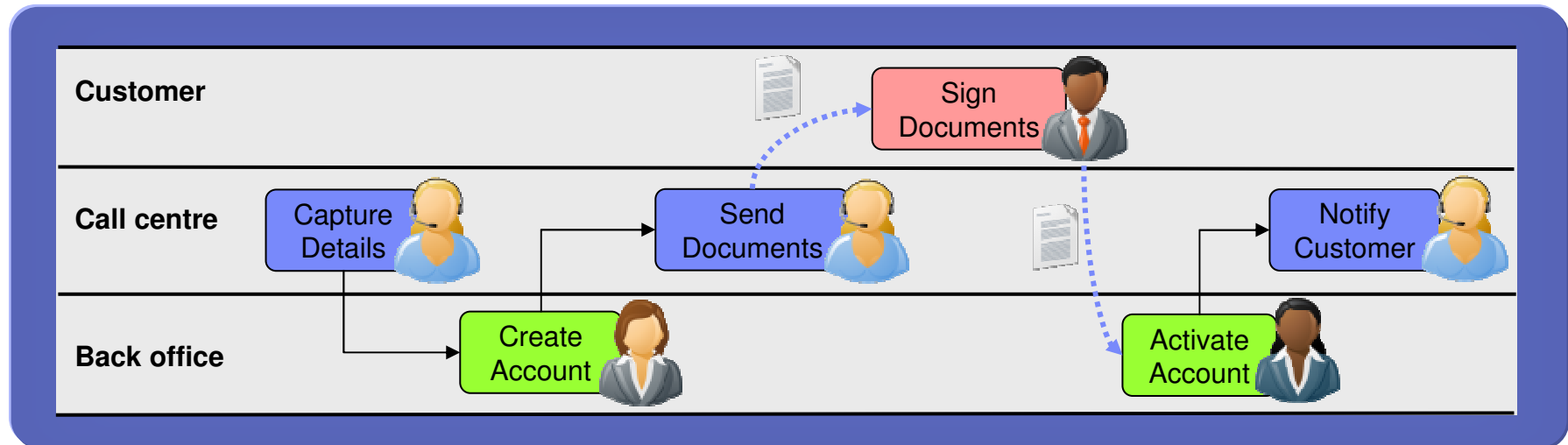
Flow automation

Task automation

Straight through processing

"Automated" flow, "Manual" tasks

- The end to end process flow controlled by a system rather than by humans deciding what to do next.

- *All the individual tasks/activities in the process could still be manual, it is only the process flow that has been automated.*

- Issue:
  - Might we now just be giving tasks to people faster than they can complete them?
  - Still have the issues of re-keying/swivel chair.

- More efficient work throughput
- Process is known, and made consistent
- Process state is visible
- Process is measurable.
- Process transitions can be reported on.
- Work is distributed, prioritised
- Reduced reliance on spreadsheets/paper/emails
- Reduced duplication from paper forms
- Mobile interaction with process enabled
- Increased data integrity of process data
- Simplified process re-engineering
- Reduced re-training

IBM ⚙ WORK ⓘ DASHBOARDS ▾

Elizabeth Jensen ▾ | Other Spaces ▾

work >

Complete Loan Rejection Form ▾

Name:

Date of birth:
___ / ___ / ___

Primary account number:

Group number:

First reason for rejection:

Third reason for rejection:

Credit score source:

Sex:
○ Male   ○ Female

Reson for credit check:

Secondary account number:

Relationship:
○ Married   ○ Single   ○ Divorced/Widowed

Second reson for rejection:

Credit score: Number of credit cards:

Rejection date:
___ / ___ / ___

When they work on a task, the human service for that task is run, and they see the first coach / screen

Complete view of process details from within any task

Complete

Details | Stream | Experts

Loan Request 3847264918 ⭐ ▾

Applicant name: **Minner, Edward N.**

Account Num: **1237890095748392013**

SSN: *****-**-1234**

Phone: **222-333-4444**

Banker: **Cutler, Susan**

Tasks

◀▣ **View Process Diagram**

Initiate Credit Check
👤 Elizabeth Jensen
Started: May 15, 2011 at 9:00 am
Due: May 15, 2011 at 5:00 pm

✅ **Verify Information**
👤 Craig Moser
Started: May 14, 2011 at 3:45 pm
Completed: May 14, 2011 at 5:00 pm

✅ **Submitt Applicant Information for Pro...**
👤 Benjamin Short
Started: May 13, 2011 at 3:45 pm
Completed: May 13, 2011 at 5:00 pm

✅ **Collect Applicant Information**
👤 Elizabeth Jensen

Team Performance Dashboard

Overview for the Team and its Work
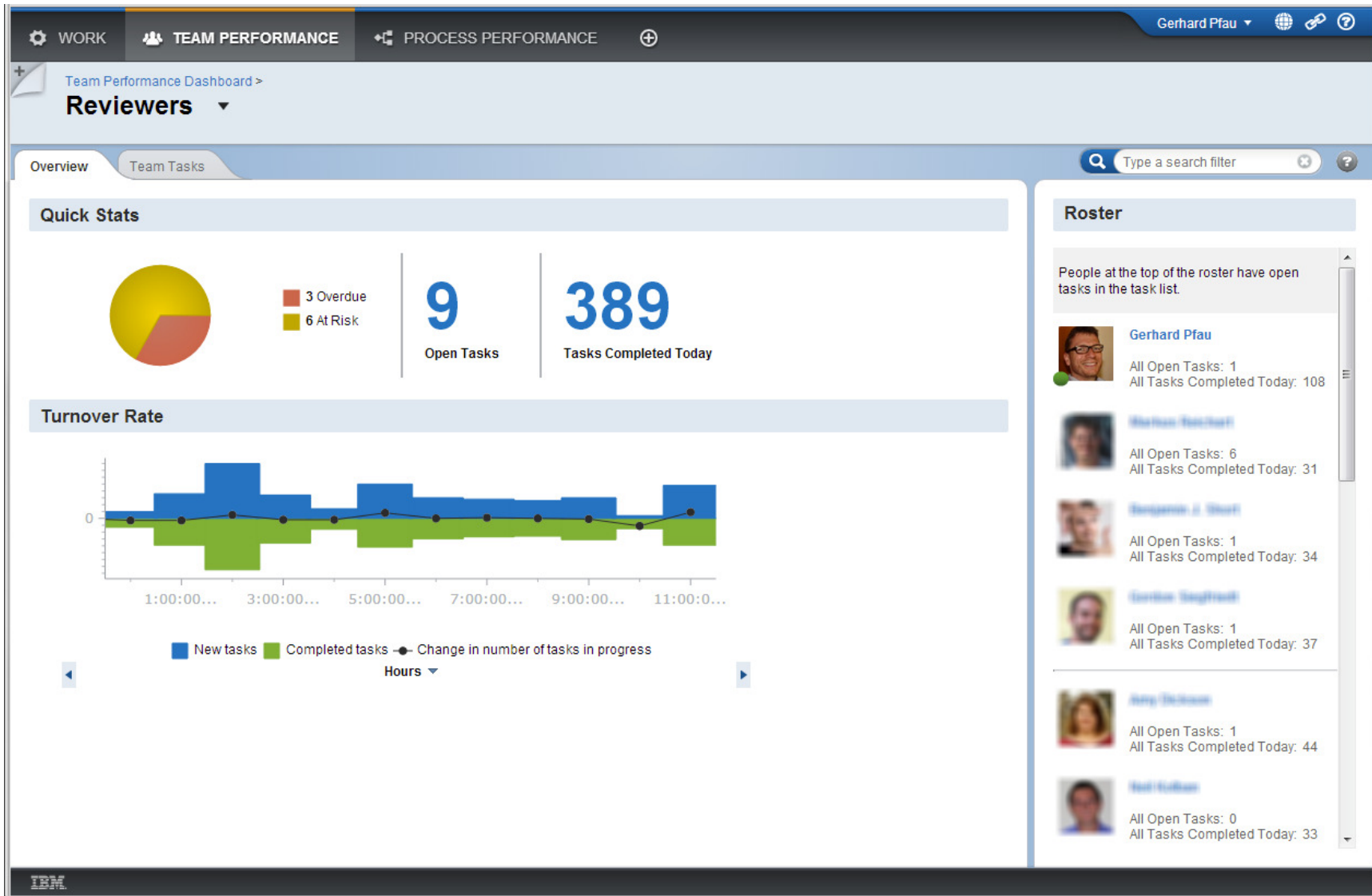
Collaboration

When collaborating, when the editor makes changes, the watcher sees them:

User 1 : types "122"

User 2 : sees user 1 typing "122"
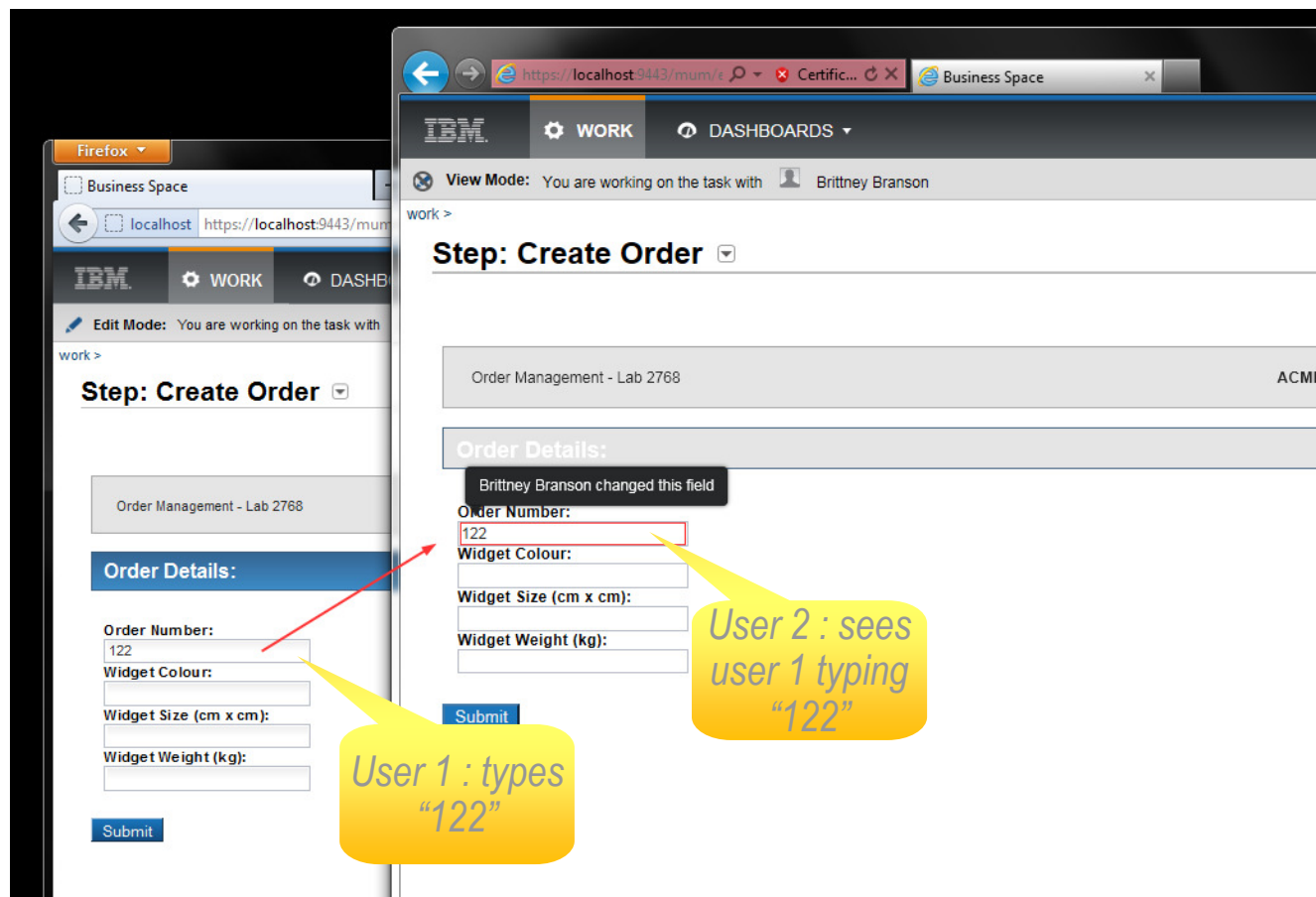
Business Process Management (BPM) provides a single, executable view of the process

Current State

Future State

After BPM
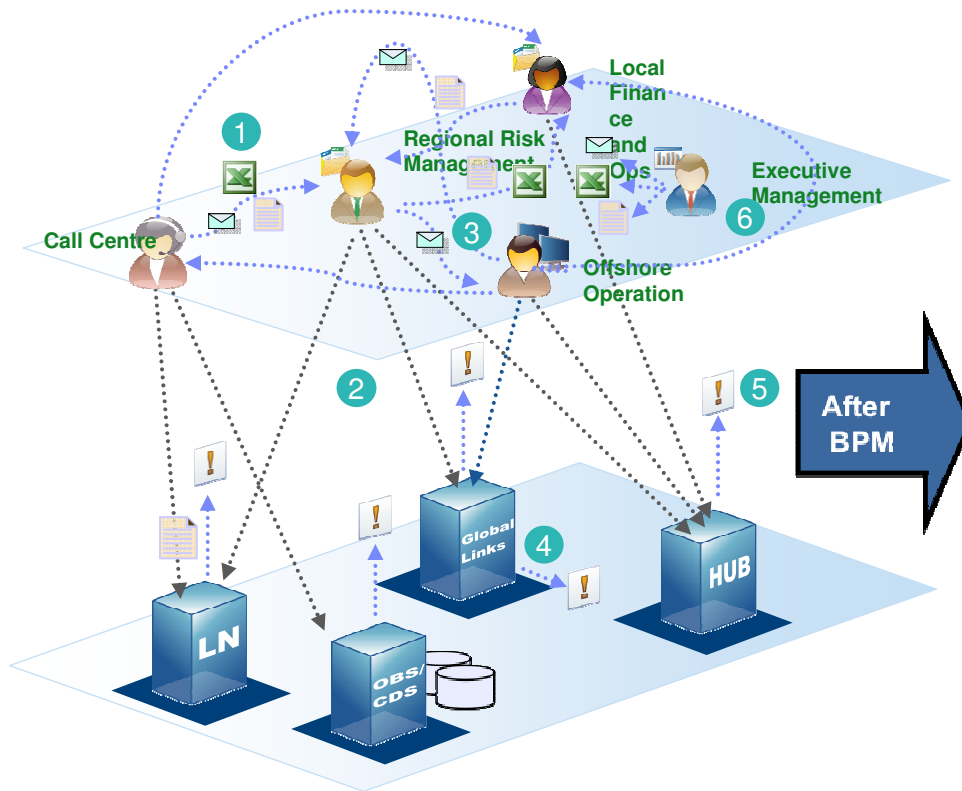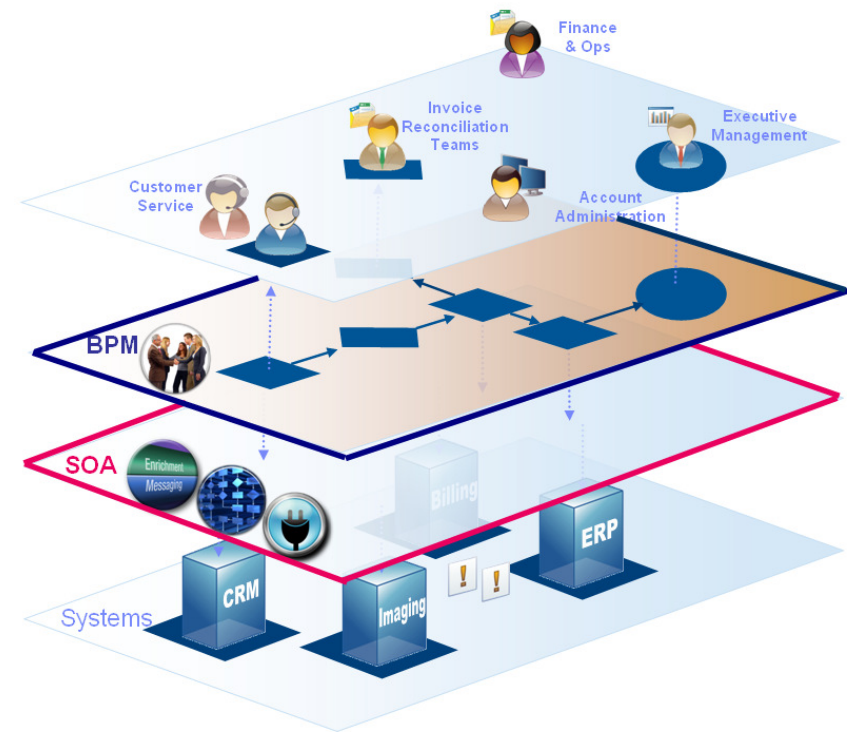
Hidden work → Process Variation → Complexity → Missing Information → Chaos

Process Definition → Management Orchestration → Defined Work Segments → Measurable Results

Service Oriented Architecture (SOA) Reference Architecture

(C) The Open Group 2009

https://collaboration.opengroup.org/projects/soa-ref-arch
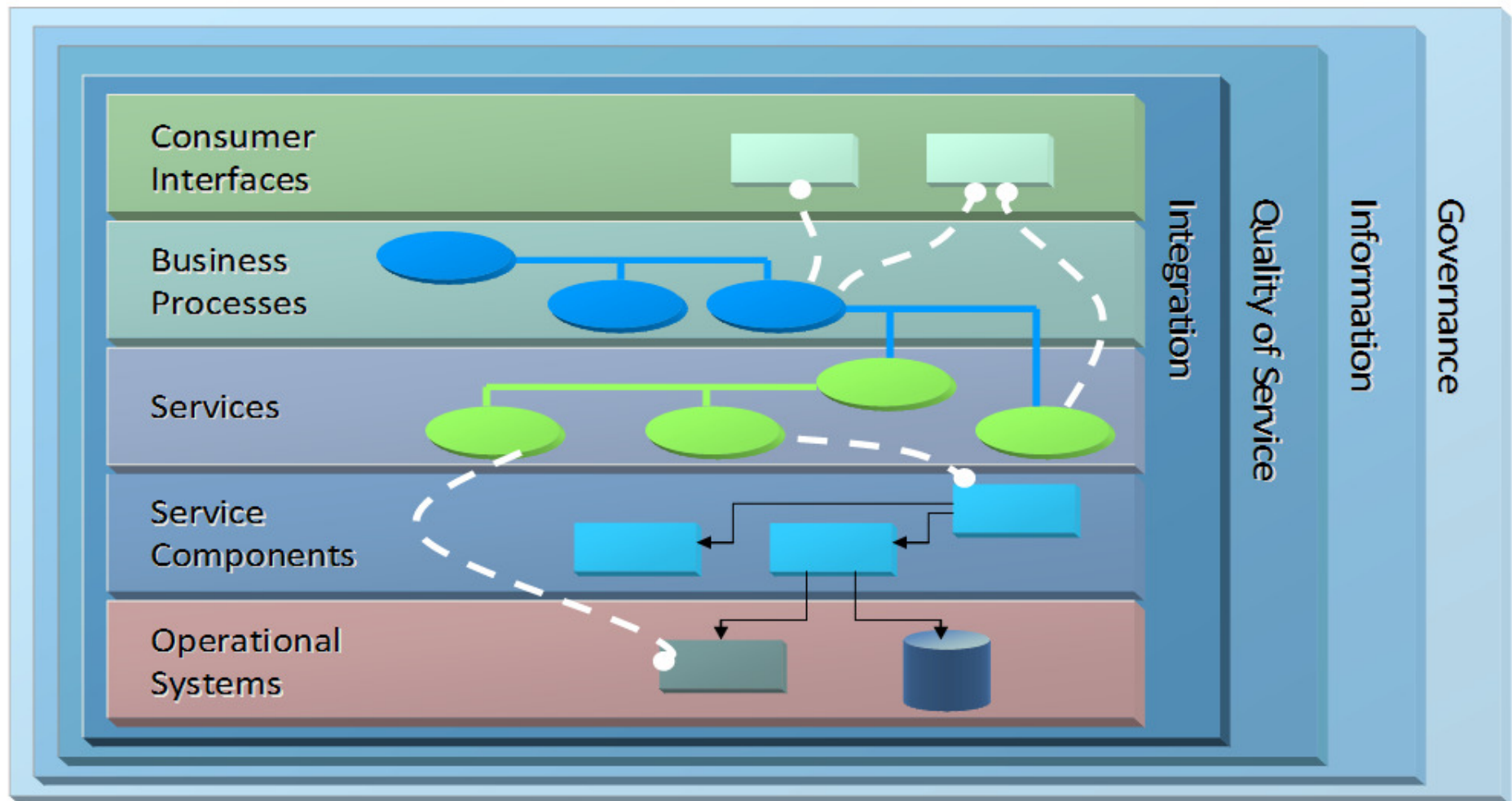
Service Oriented Landscape
Introducing standardised service exposure

Consumers

Registry

Design time

Runtime

Service Exposure (internal)

Integration

Service Exposure Gateway

Integration Hub

Adapter

Adapter

Operational Systems (Applications & Data)

Service Exposure
- Virtualisation
- Visibility
- Traffic Management
- Security

Canonical Integration
- Data Translation
- Routing/Distribution
- Orchestration

Adaptation
- Data Handling
- Interaction Framework
- Connection Management
- API
- Protocol conversion
- Transport communication

BPM leveraging a Service Oriented Architecture

Business Process Management

Customer

Sign Documents

Call centre

Capture Details

Review Documents

Back Office

Create Account

Notify Customer

System

Send Documents

Activate Account

Service Exposure (internal)

Service Exposure Gateway

Integration

Integration Hub

Adapter

Adapter

Adapter

Operational Systems
(Applications & Data)
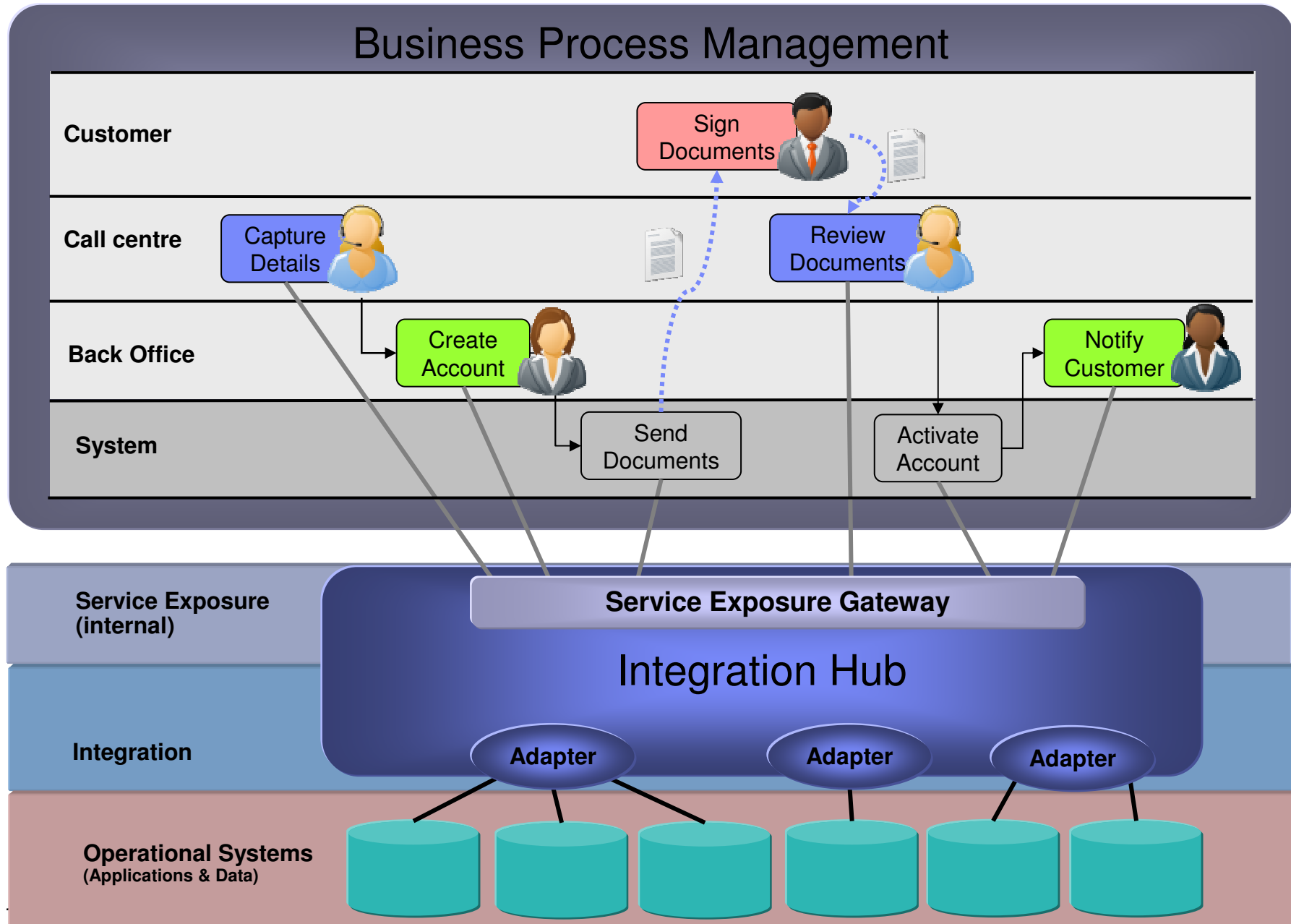
Integration "on the glass"

"Create a screen specifically for my task, that makes me as effective as possible."

- Single user interface, with service calls to underlying systems
  - UI calls services via ESB, or directly via API
  - Users need not have to be familiar with user interfaces of underlying systems.
  - No re-keying of data
  - Resulting data easily drawn back into the process.
  - If errors occur, user is still has visibility of where the error occurred in order to take remedial action.
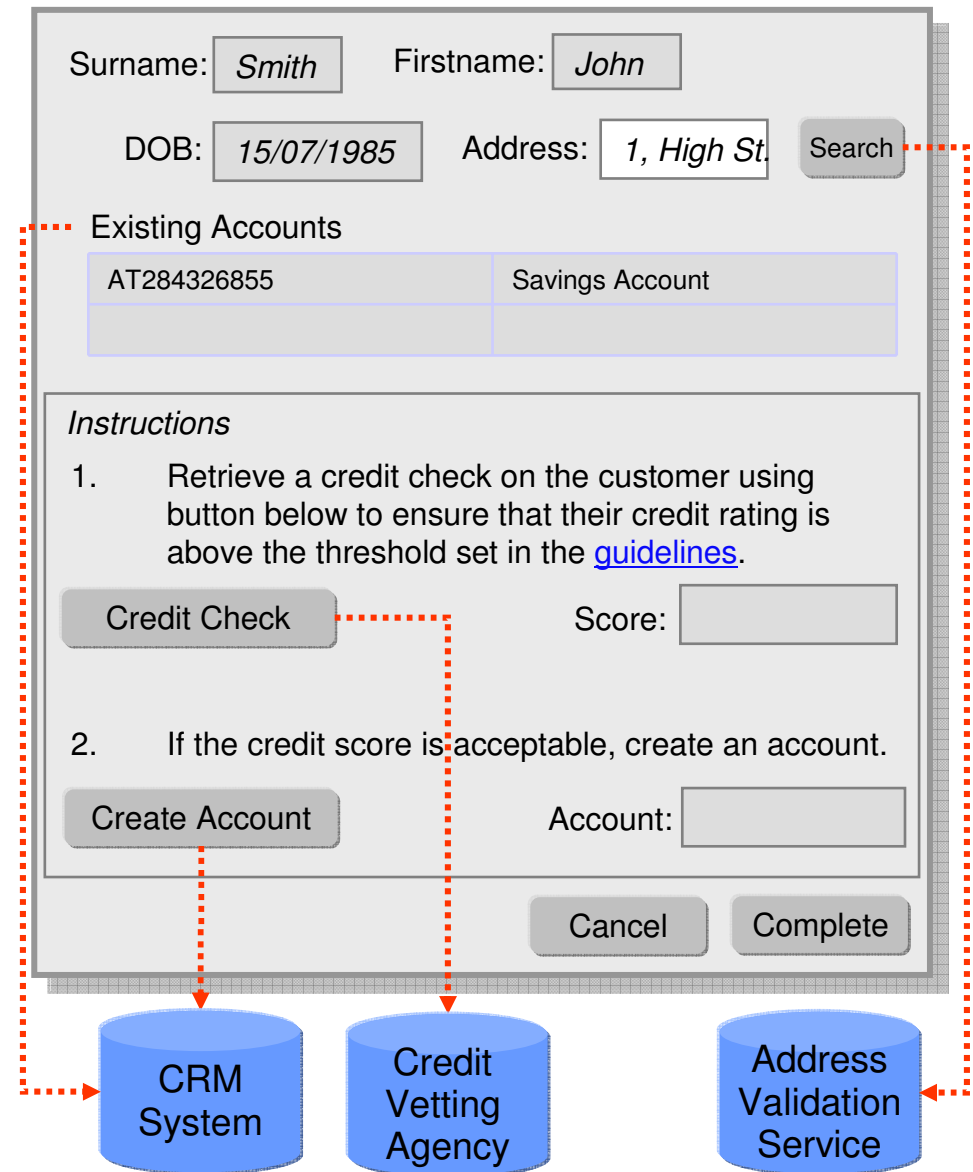
- Issues
  - Required systems must be available via an exposed API.
  - Response from services must be real-time. 1-3 seconds typically.
  - User is still co-ordinating the requests to the systems. Could be further automated.
  - User interface is coupled to the APIs of other systems. ESB pattern should be considered.

Surname: *Smith*   Firstname: *John*

DOB: *15/07/1985*   Address: *1, High St.*   Search

Existing Accounts

AT284326855	Savings Account

Instructions

1. Retrieve a credit check on the customer using button below to ensure that their credit rating is above the threshold set in the guidelines.

Credit Check   Score:

2. If the credit score is acceptable, create an account.

Create Account   Account:

Cancel   Complete

CRM System

Credit Vetting Agency
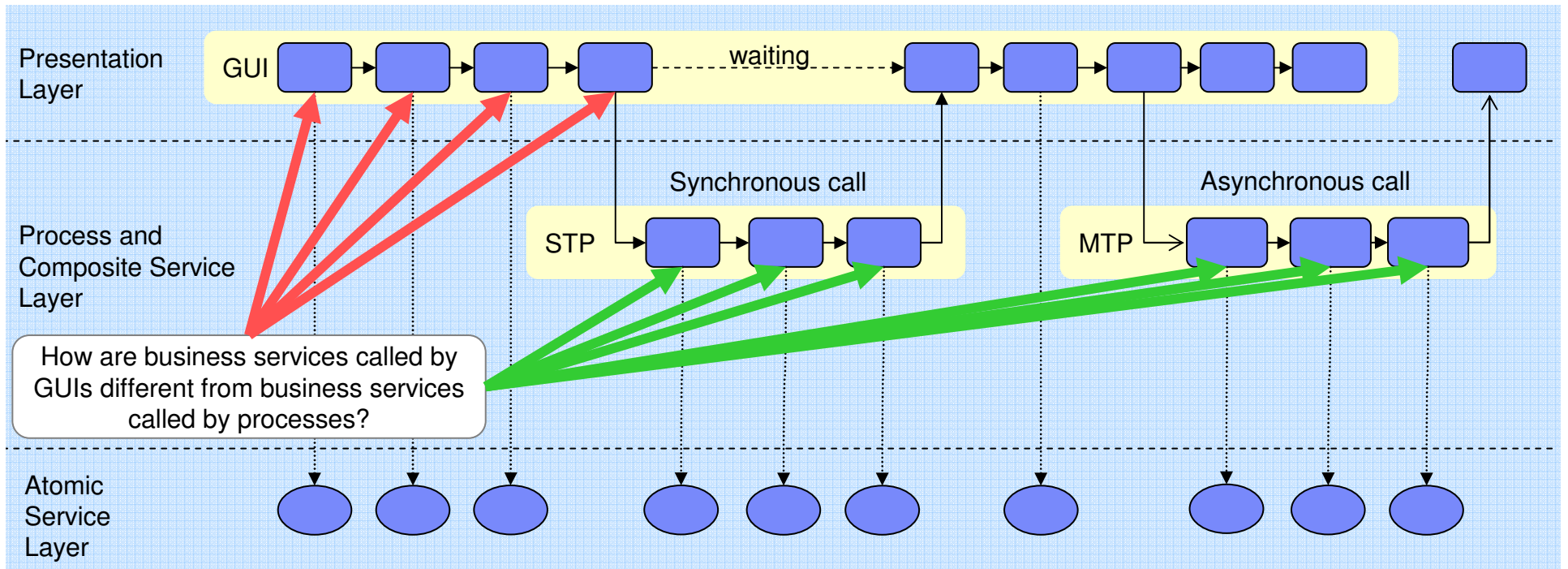
Address Validation Service

Types of Automation: Task Automation

- Tasks that were done by people, are now performed by systems instead.

- *It's not all or nothing. Tasks could be partially automated, or their most common cases could be automated.*

- Issues
  - Is the task worth automating? How often does it happen? How much of the current end to end time does it take?

- Simplifies data entry
- Faster activity completion
- Reduce end to end process duration
- Removes unnecessary touch points
- Improved data consistency
- Improves process availability
- Eliminate laborious re-keying
- Reduced data duplication
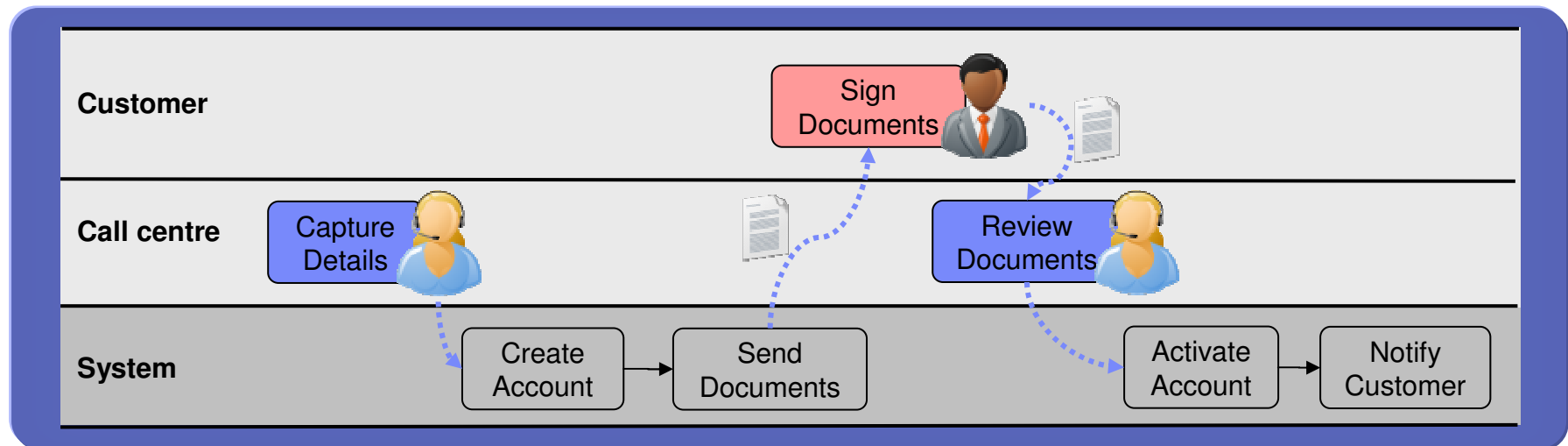
How different are Humans and Systems as consumers?

Differences between UI consumer and BPM consumer

Characteristic	User Interface Consumer	Automated Consumer
Functional	Full data typically required Response may have to be acknowledgement rather than completion	Opportunity for key data only. Can wait for completion
Data Integrity	Rarely transactional all the way from the UI itself. Optimistic locking generally required for scalability Idempotence may be required to avoid duplicate submissions Event sequencing less likely to be an issue.	Can participate or even control a global transaction Pessimistic locking often preferable for simplified error handling Idempotence less of an issue if transactionality present. Event sequencing and race conditions become more common concern
Error Handling	User often part of error handling strategy Data validation ideally handled by user screen	User not online, so most error paths must be codified. Late validation errors very challenging. Validation must be pushed back to capture point.
Security	Requestor's identity can be used for actions. Adjustments to the data can be handled by the requestor immediately.	Requestor no longer present when doing actions. Whose identity should be used and how. How are asynchronous errors are resolved, who can see/change the data?
Availability	Services must be available when users are present.	Brief outages can be tolerated.
Performance	Response times must be user acceptable, even at peak usage times. Batch processing generally unacceptable.	Response times can be longer. Throughput is the priority. Can process in batch if necessary.

Characterising the interface

Interface Characteristics

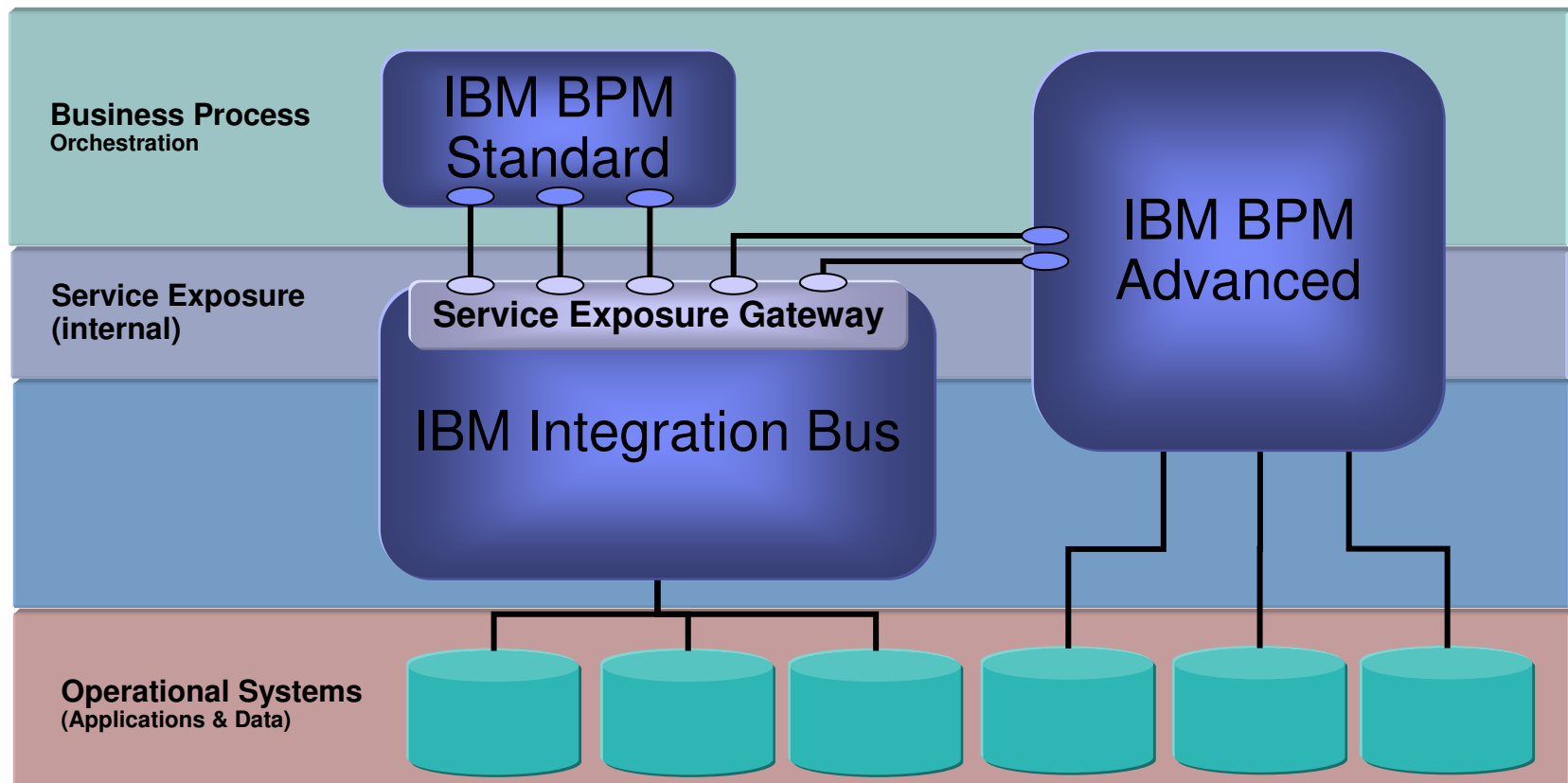|	
Data	Integrity
Technical interface	Security
Interaction type	Reliability
Performance	Error handling

Requester

Provider
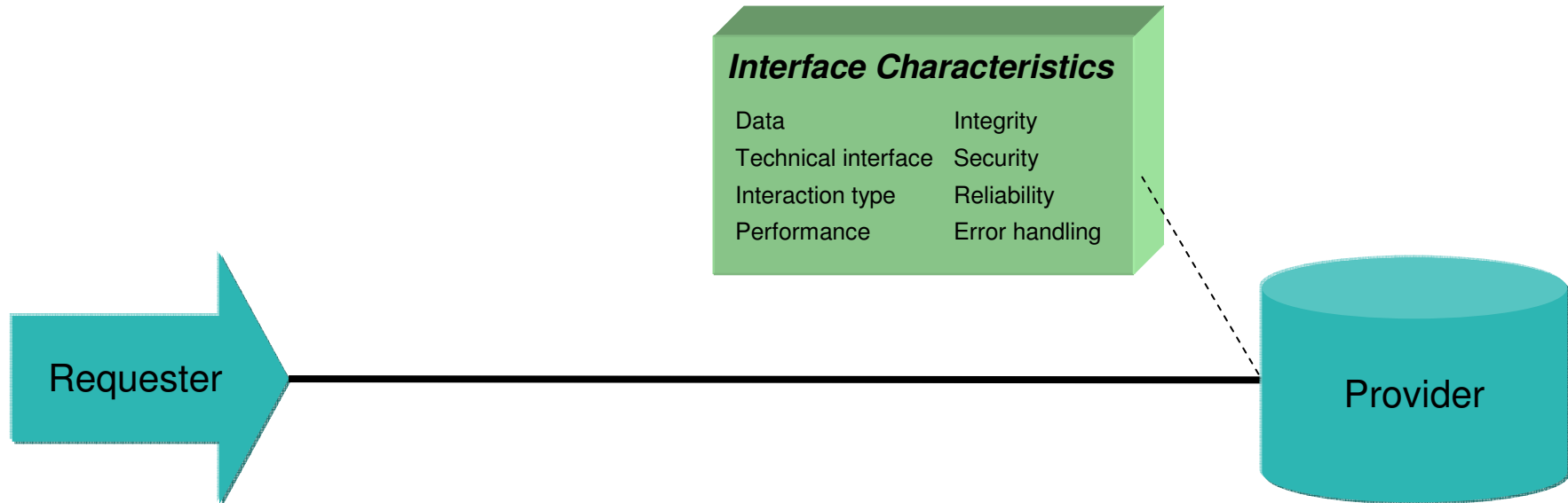
Capturing integration complexity for BPM and SOA solutions
http://www.ibm.com/developerworks/websphere/techjournal/1112_clark/1112_clark.html

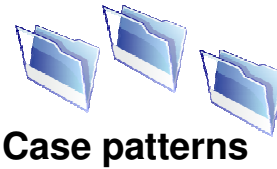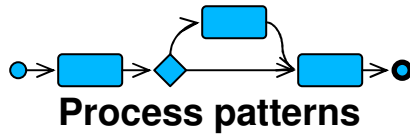# Process driven top down definition of services

- **Existing: BPM can import existing services exposed by IIB**
  - IIB provides powerful connectivity layer for BPM workflows and enables strategic enterprise service bus pattern for broader re-use

- **New: IIB v9 - Define service during process design in BPM**
  - Create service interface in IBM BPM, then import to IIB for implementation
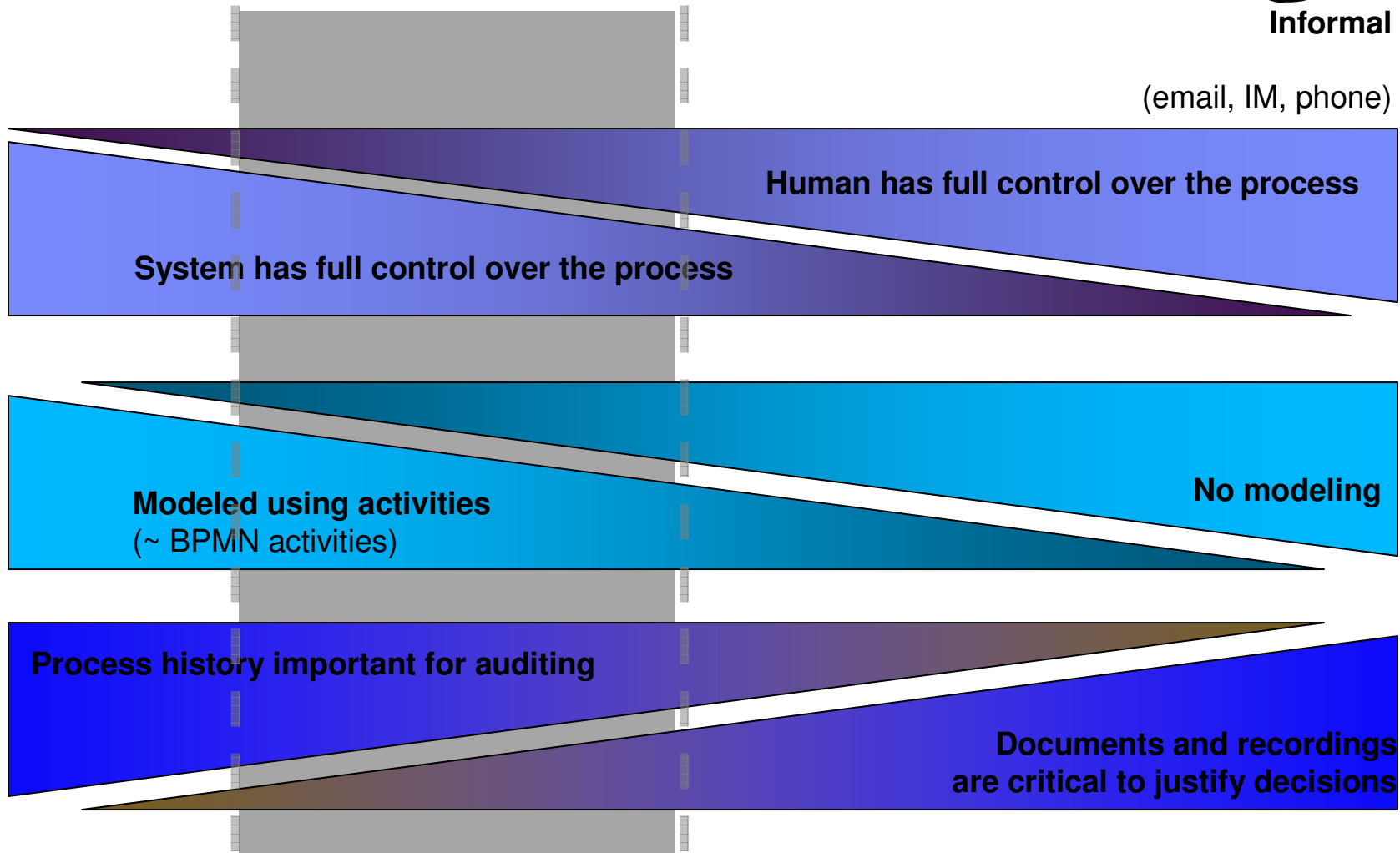 - BPM pattern simplifies creation of service implementation

Structured vs. unstructured flow
A spectrum of process types

Process patterns

Case patterns

Informal

(email, IM, phone)

Human has full control over the process

System has full control over the process

Modeled using activities
(~ BPMN activities)

No modeling

Process history important for auditing

**Documents and recordings
are critical to justify decisions**

Blended processes – structured flow and case management

Customer
Sign Documents

Call centre
Capture Details
Send Documents
Review Documents
Notify Customer

Back office
Create Account
Activate Account

Fraud Team
Investigate Fraud

Case-centric activity
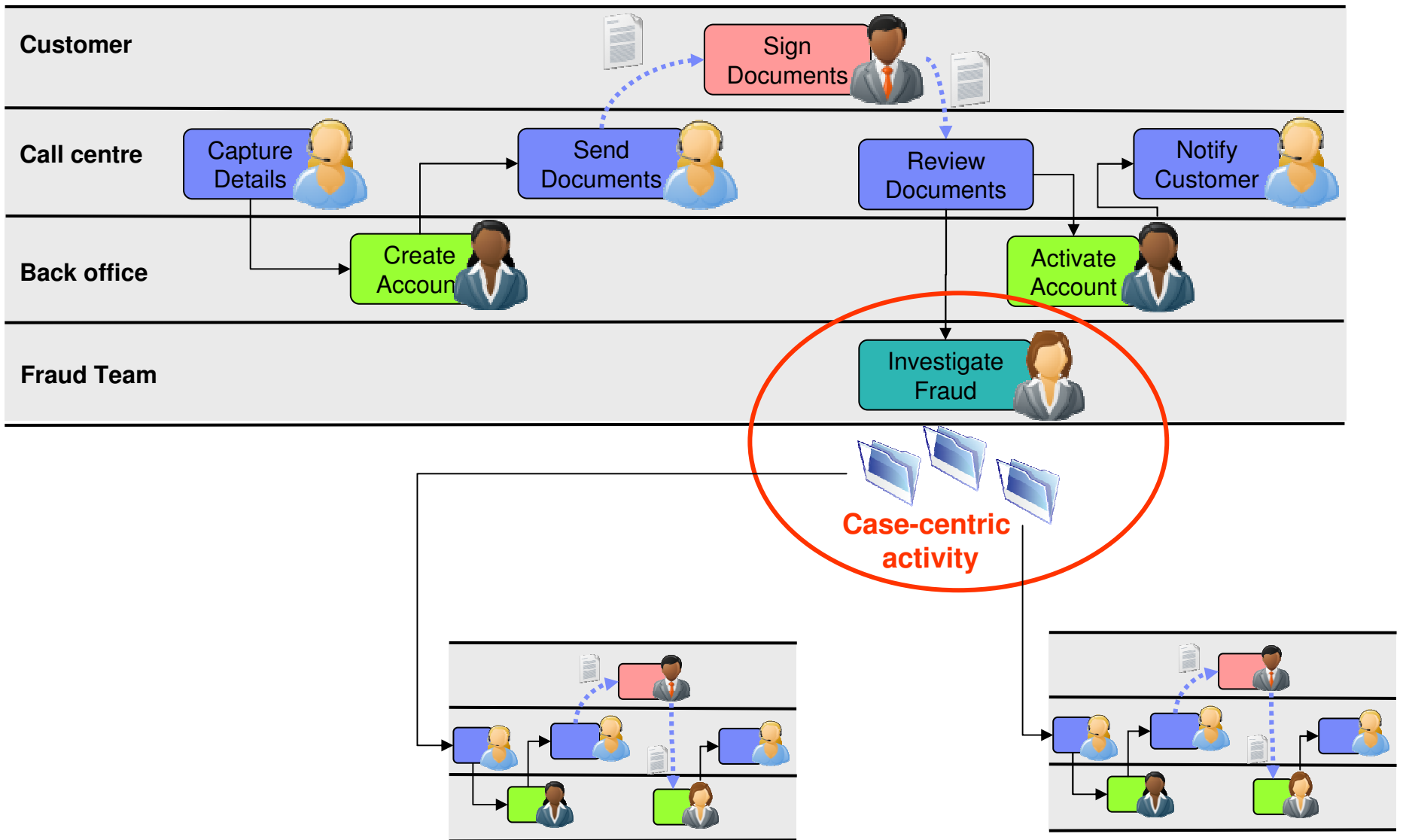
Consistent Document Management

Uniform storage and access of process-related documents

- **New internal repository** provides the same CMIS-based access as external ECM systems
- "CMIS Toolkit" now delivers a single, consistent way of accessing all process documents
- Migration / backward compatibility with previous IBM BPM versions

CMIS Toolkit
- Document List
- Document Viewer
- C/R/U/D services

FileNet CM
IBM CM8
Alfresco
SharePoint
...
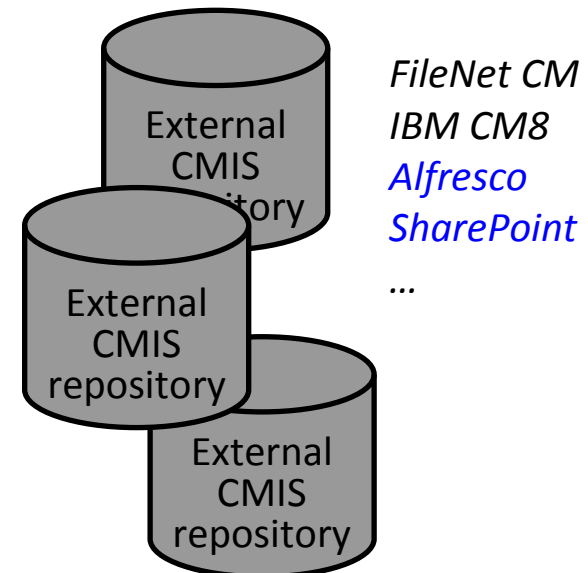
CMIS = Content Management Interoperability Services

BPM capabilities mapped to IBM products

Business Process Modelling

Business Process Implementation

Business Rules and Events

BlueworksLive

IBM **Business Process Manager**

Business Activity Monitoring

Business Process Management
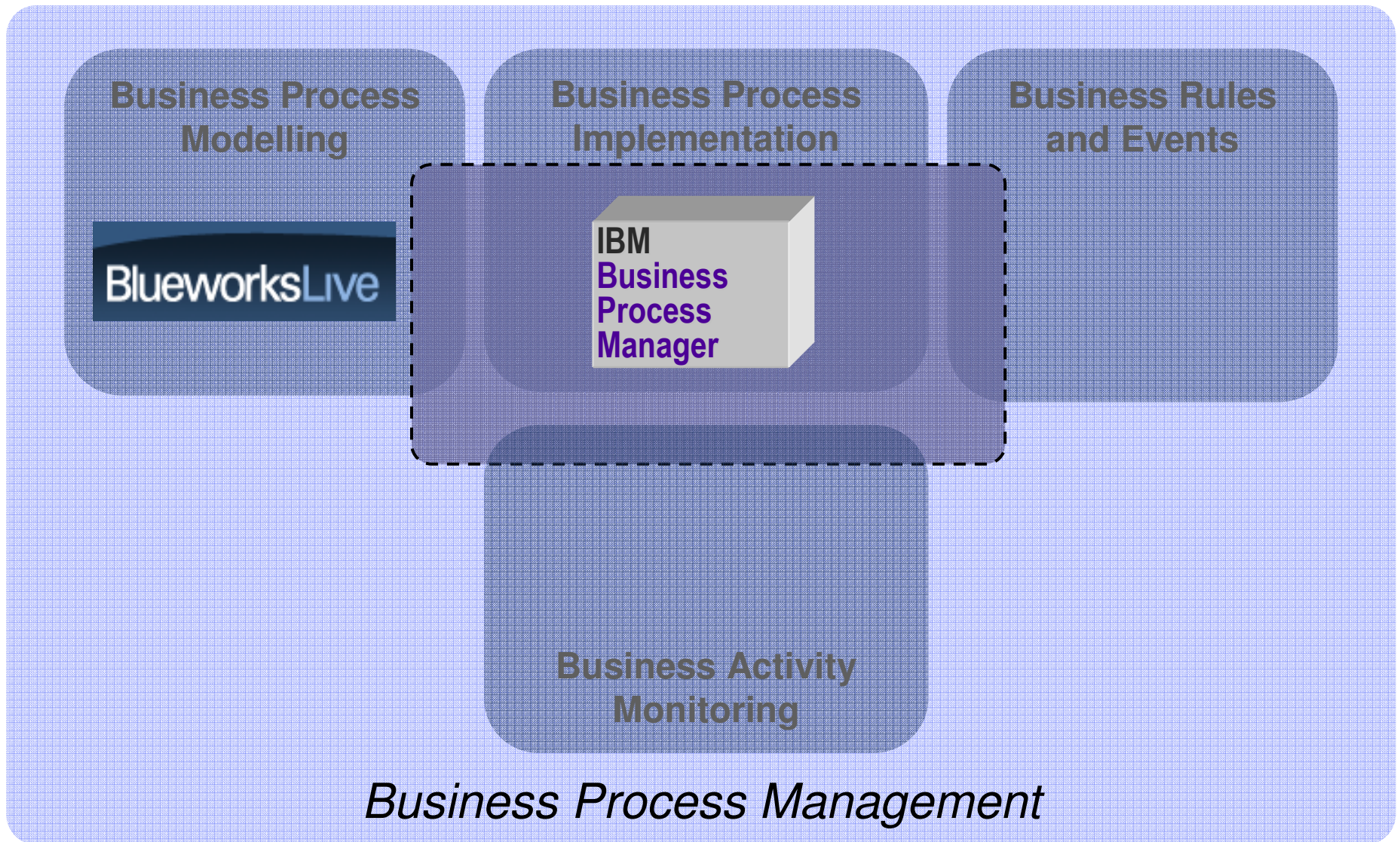
Decision Support

"Ensure I only do the task when it's really necessary, and that I only the part of the task that I'm most suited to"
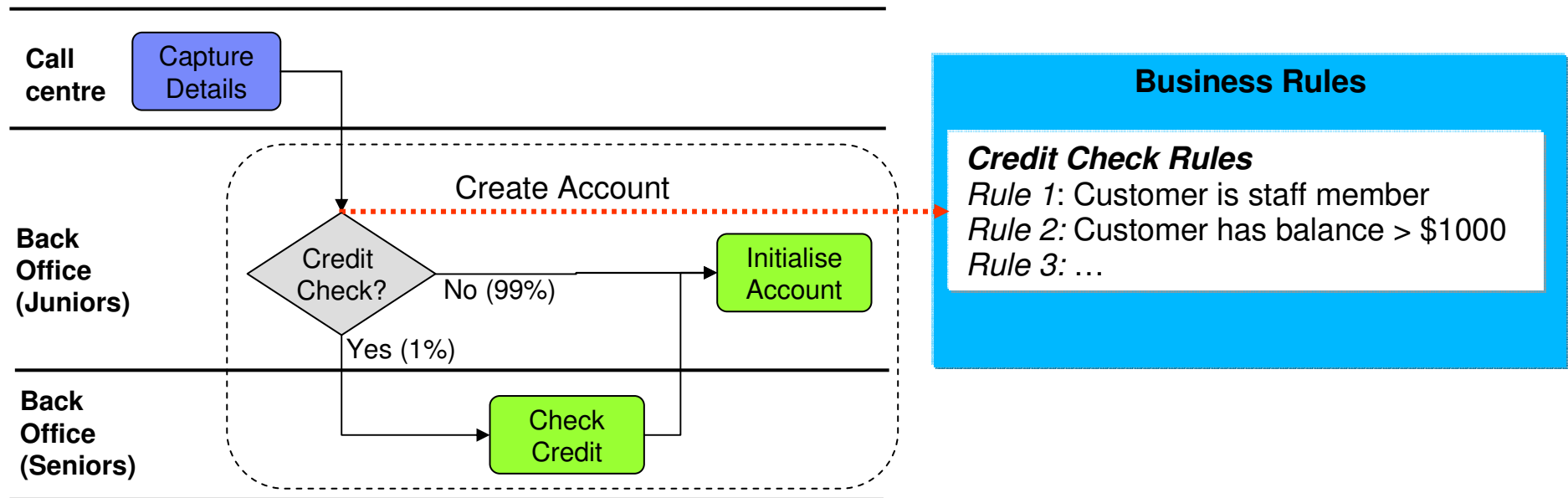
- **Reduce how often the task is included in the process**
  - Average time of the task is reduced.
  - Better distribution of work between junior and senior resource.
  - Really a "flow optimisation", but could be seen as "task optimisation" if we consider that the sub-process as still representing the original task

- **Externalise the decision criteria to a business rule**
  - Analysis of process statistics may turn up further opportunities to bypass the task, and these can then be introduced at runtime.
  - Passing more process data to the rule allows for most options at runtime. However, it also couples the rule to the process data model.
  - Rules can be derived from historical data from the current process. Look for trends in the monitored data.

Business Rule Examples

*If the **Passenger** is a **gold frequent traveler**
and the **flight distance** is more than 40000 miles
and the **flight destination** is in Europe or Asia
Then
Add 10.000 points to the fidelity card of the **Passenger***

*If the **Vehicle** is not an SUV
and all the following conditions are true*
- *the **vehicle** is equipped with dual passenger airbag*
- *the **driver** has a good driver certificate*
- *the **driver** age is between 30 and 50*
- *the number of accident the **driver** was responsible for is 0*

*then
Apply a **5% discount** on the premium coverage price*

Business Decisions

Reasoning with

Business Contexts

Passenger(*age, address, gender, frequent traveler level, company*)

Vehicle (*VIN, Manufacturer, Data, Type, Brand*)

Order (Amount, items)   **Promotion** (*Code, amount, type, article*)

Flight (*FID, Airline, Depart, Destination, Distance, Date*)

Plant (*Location; production, Profitability*)

Contextual

BPM capabilities mapped to IBM products

Business Process Modelling

BlueworksLive

Business Process Implementation

IBM
Business Process Manager

Business Rules and Events

IBM
Operational Decision Manager

Business Activity Monitoring

Business Process Management
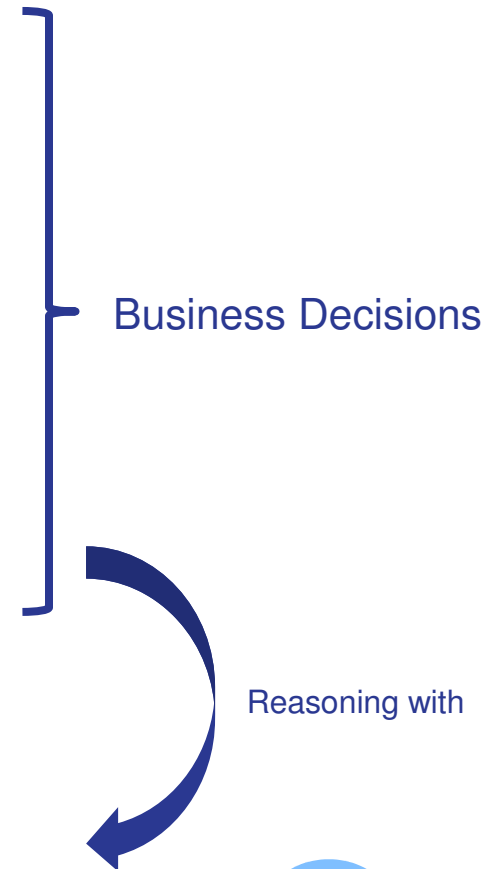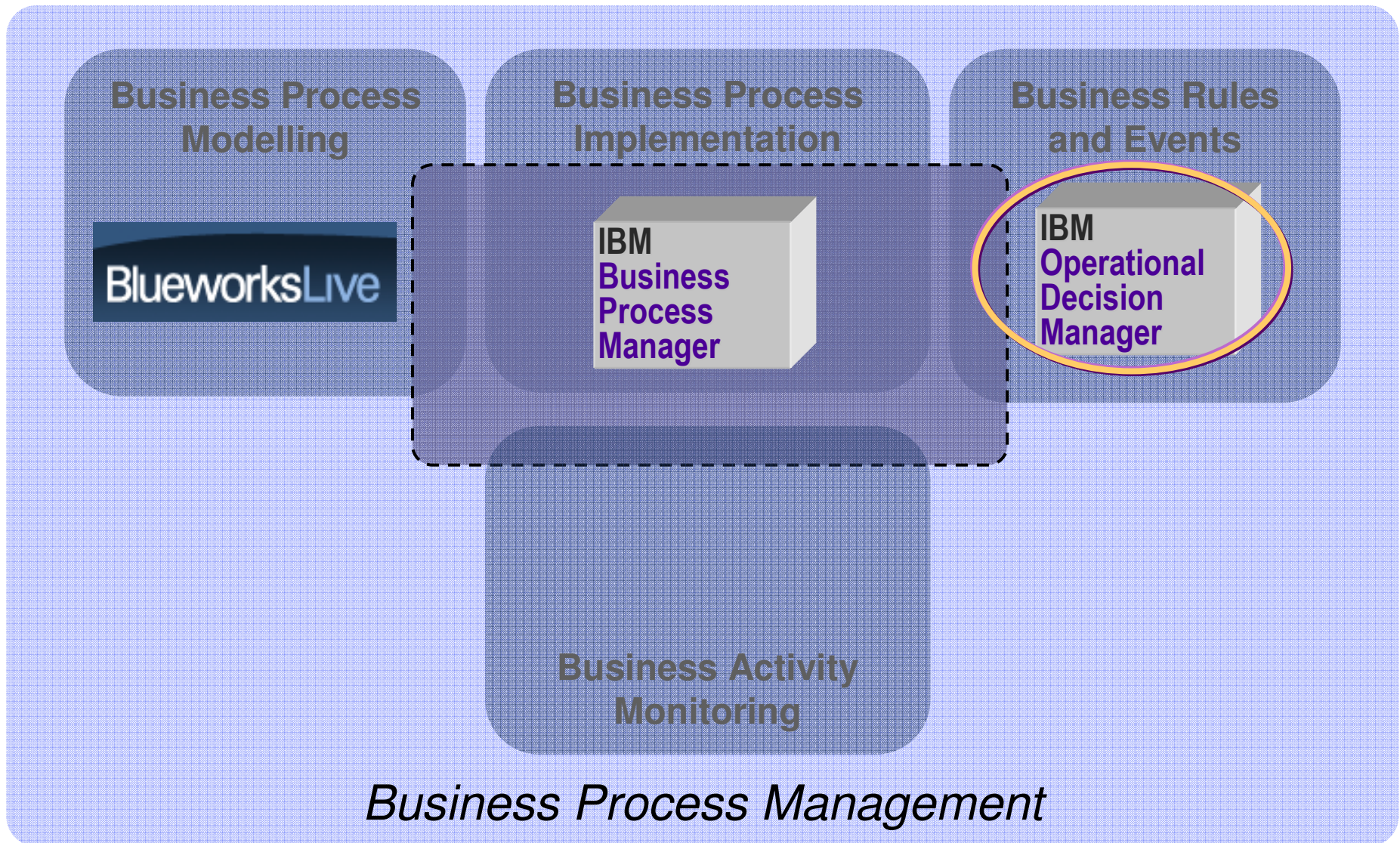
Full Decision Lifecycle Management

Manage changes in a safe and predictable environment
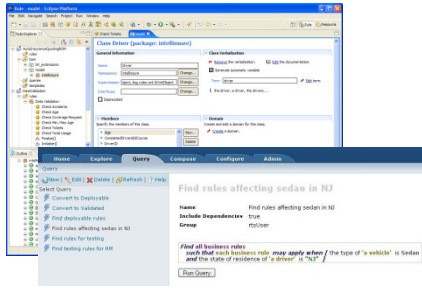
Developer

Business
Analyst

Policy Manager
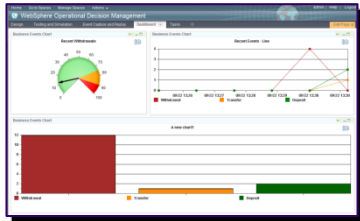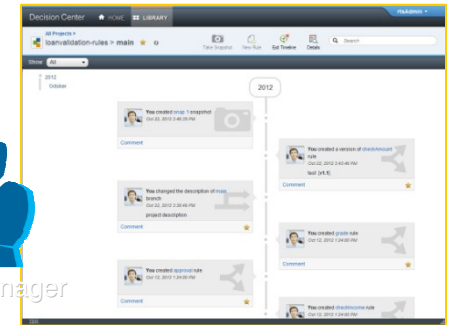
System Administrator

Rule Administrator

Model

Analyze

Author

Monitor

Complex Decisions

Validate

Execute

Test

Deploy
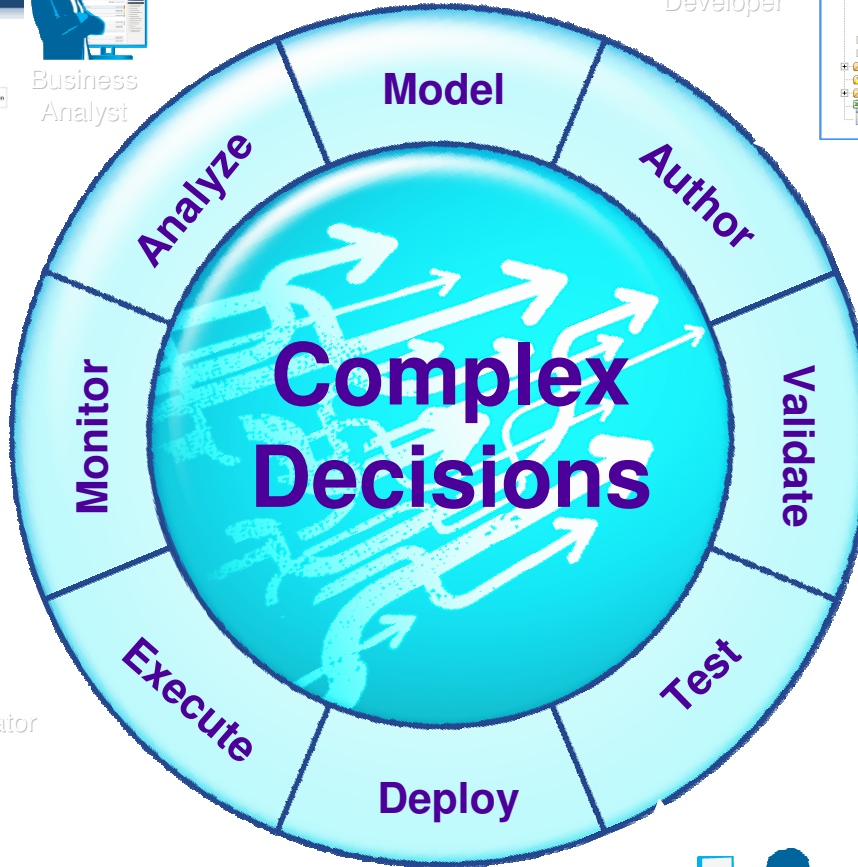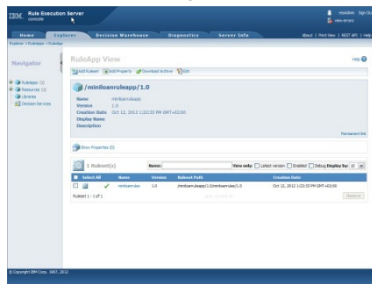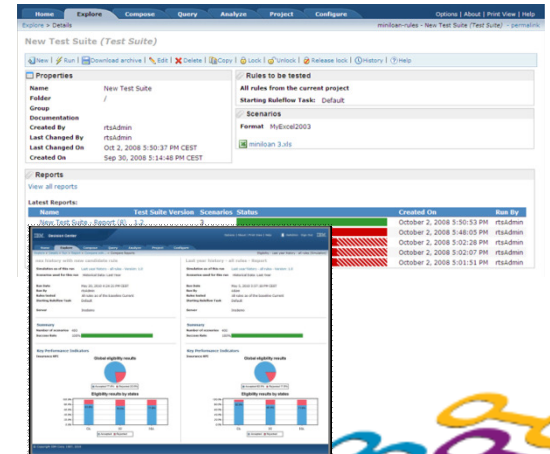
Fully automated task

"Just do the task for me."

- Remove user interaction
  - End to end time vastly reduced
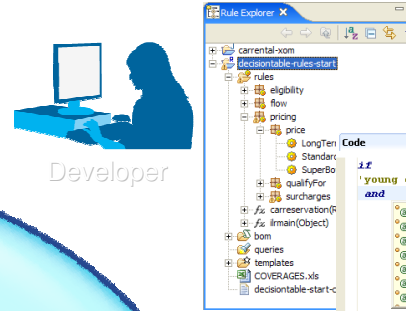 - Throughput vastly increased (orders of magnitude)
  - Headcount reduced/released for more important work

- Issues
  - Many exception handling now pushed to the domain of IT operations.
  - Exceptions harder to diagnose.
  - Business less familiar with the process and the back end systems, so less able to assist with exceptions.

Call centre — Capture Details

Create Account

System — Credit Check? — No — Acceptance Check — Reject — Notify

Yes — Check Credit — Accept — Create Account

Credit Check Rules | Credit Vetting Agency | Accept Rules | CRM System
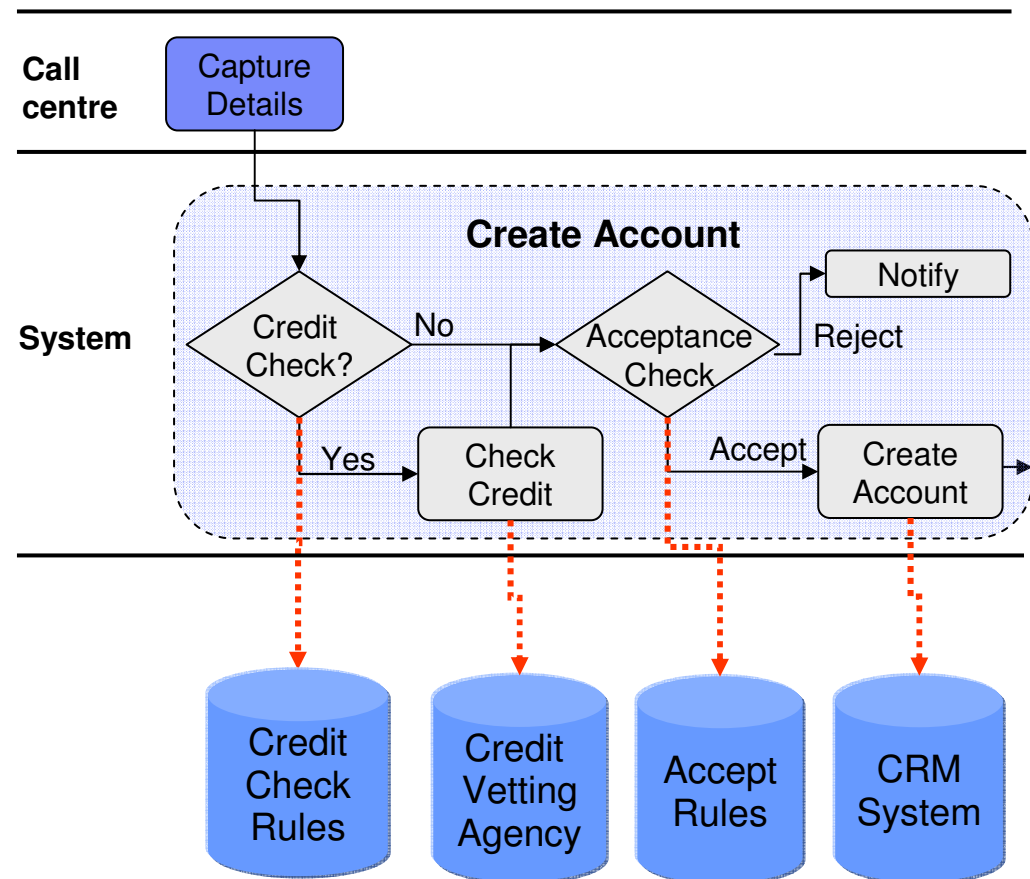
Orchestration/Composition
Where *could* it occur / Where *should* it occur?

Consumers

Screenflow/
page navigation

Business Process

Business process

In-app.
workflow

Service Exposure

Straight-through
processing

Data
synchronization

Integration

Microflow

Operational Systems
(Applications & Data)

Stored procedure
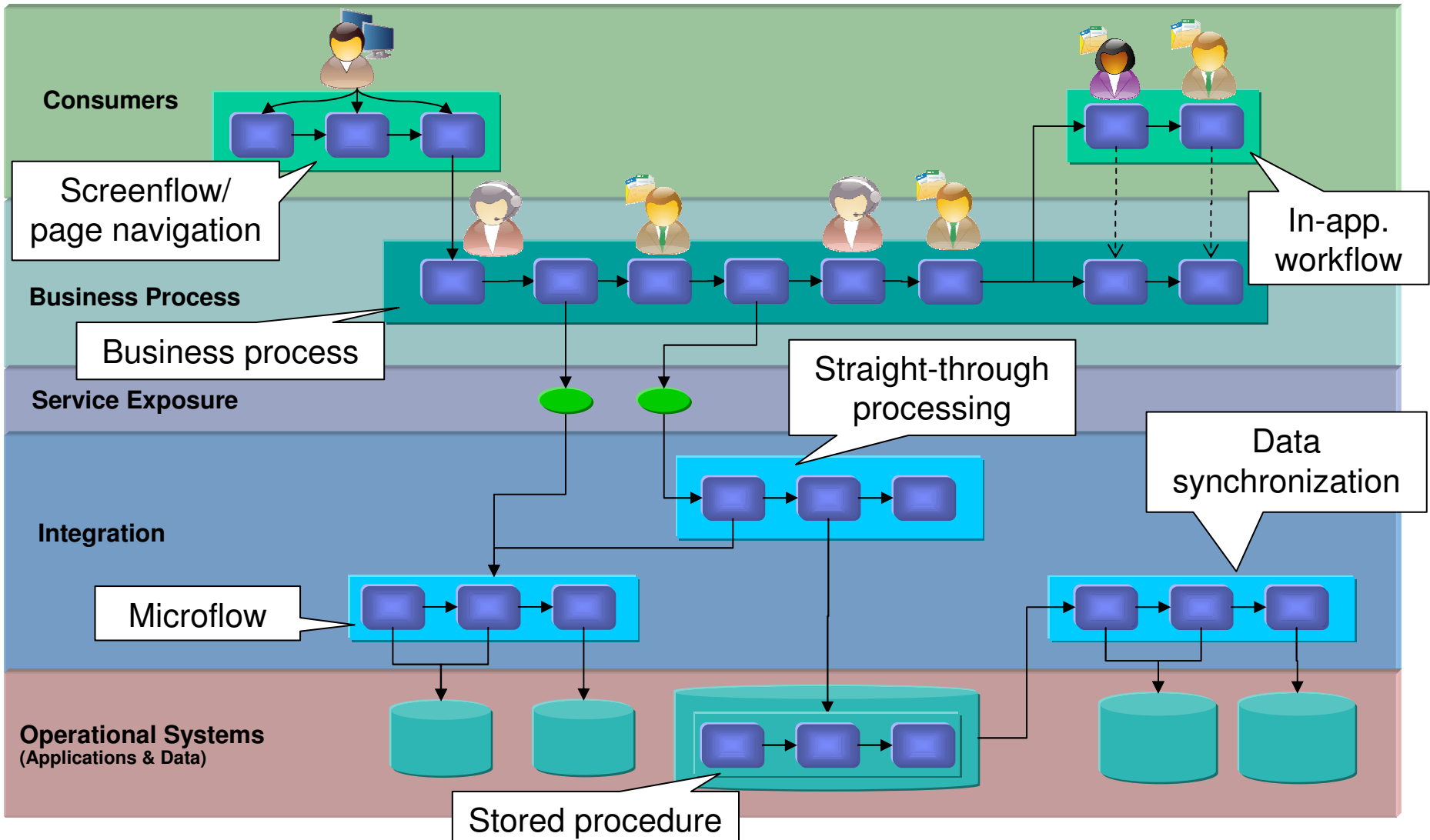
Types of Orchestration: *Process vs. Composition*

- **Process**
  - Makes calls to mature high level services
  - Often triggered (i.e. one way call) rather than invoked as a two way call
  - Where it is invoked as a two way interaction, the caller is typically asynchronous (i.e. not a user) and therefore the service level agreement is throughput based rather than response time based
  - Stateful persistence of the steps in the process
  - Events can correlate with the running process
  - Often involves human interaction to perform some tasks within the process

- **Composition**
  - Grouping of relatively granular interactions
  - Response time is the primary driver for the service level agreement
  - Common for aggregation functions
  - Some or all the granular interactions may not themselves be exposed as re-usable services
  - Generally state free
  - Never involves human interaction during the composition

Partially automated task

"Do the task for me, and I'll just review it."

- Minimise the user interaction
  - Data for the task is pre-fetched. Interaction need not be real-time – could be asynchronous enabling better workload balancing on back end systems.
  - Actions performed as a result of the task are done asynchronously following the task.
  - Data is presented in a context specific format
  - Human resource is used only for what it is best at – e.g. complex decision making
  - **Good for "mobile" users. Review task is much simpler, and can be viewed and acted upon on a smaller device. E.g. "inline tasks completion"**

- Issues
  - User loses awareness of how to interact with back end systems should they need to revert to manual processing.
  - Changes to the back end systems' APIs break the process. (ESB pattern would help with decoupling here).
  - User may need results from the follow on actions (e.g. may need the account number created to pass back to the customer).
  - Services/APIs need to be appropriately exposed for use by automated consumers
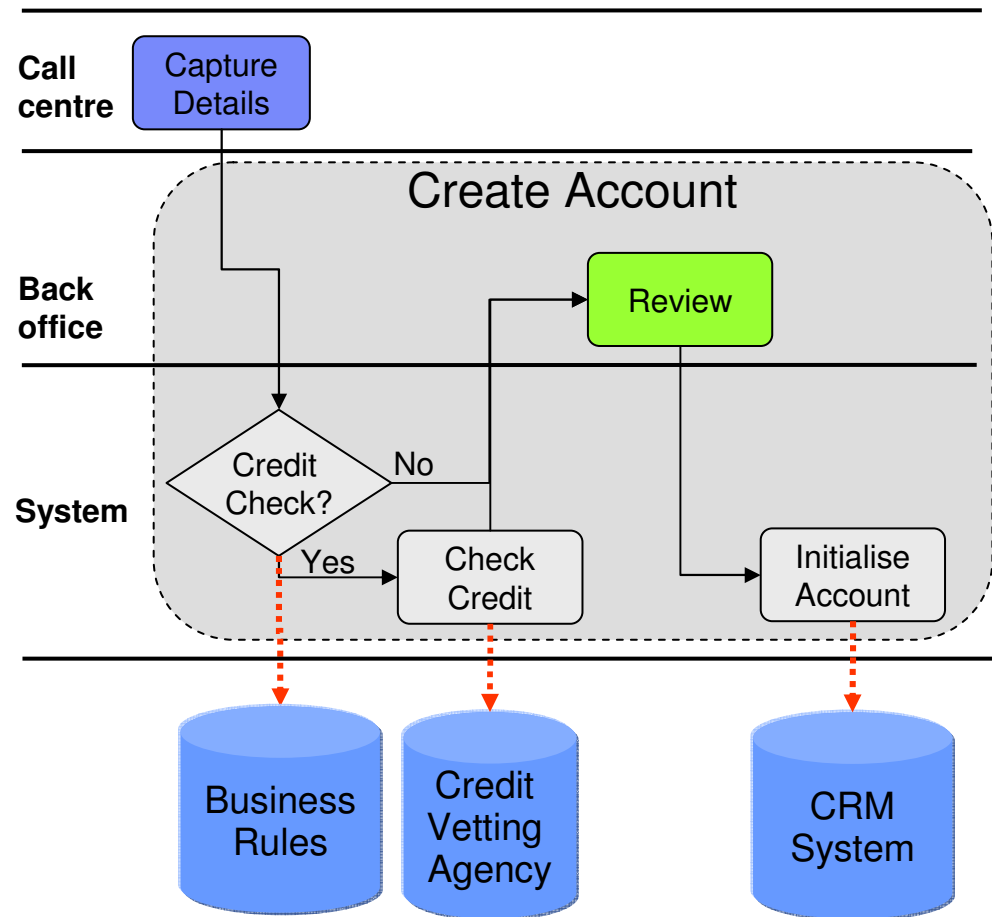
Mobile Functions

Mobile Access
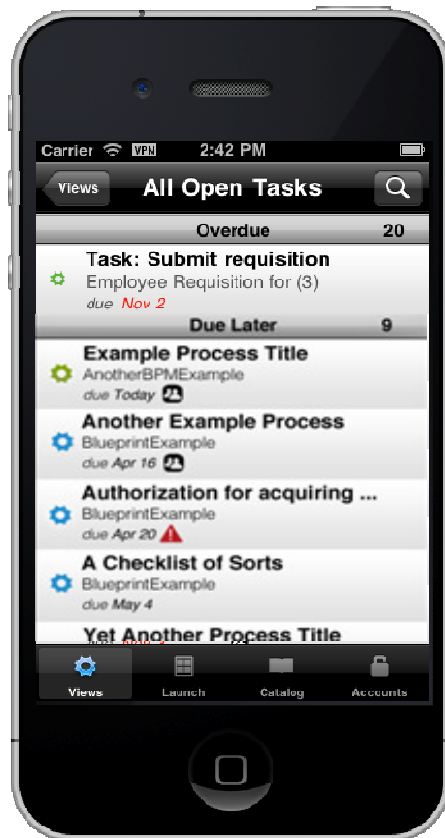
- **Native mobile app for iPhone / iPad** promotes broader adoption and easy access to Blueworks Live & IBM BPM tasks

- **Consolidates all of your process related work** into a unified view

- **Mobile ready widgets** so you can introduce your own data capture pages into the stanard application

- **Extensive REST APIs & examples** enable customized integration of IBM BPM and Blueworks Live content into your own mobile experiences

Extending SOA beyond the enterprise
The same, but different

- **SOA in the enterprise**

  – Enterprise SOA has typically involved exposing a *small number* of *heavily used* interfaces based on *core business functions* where *usage and audience are roughly known*.

- **Beyond the enterprise**

  – Services may already be exposed internally, so further exposure may not appear to be a huge task.

  – However, type of interfaces required may be different – RESTful interfaces are flexible *entity based interfaces* since they *do not know the intended usage*.

  – The *audience is external and unknown*, so a more *formal relationship with partners* is required

Extended SOA reference architecture
Externally exposed services via API Management

Consumers (internal)

Business Process — Orchestration

Service Exposure (internal)

Integration

Operational Systems (Applications & Data)

Business Process Management

Service Exposure

Service Registry

Integration Hub

In-house

Consumers (external)

Service Exposure (external)

Integration

Service Exposure

API Management

Integration Hub

Different types of service exposure

Service Exposure

| Partner Management |
| Accounting |
| Self Administration |
| Virtualisation |
| Visibility |
| Traffic Management |
| Security |

Service Exposure (external)

Service Exposure (external)

Integration

Service Exposure (internal)

Service Exposure (enterprise)

Integration

Operational Systems (Applications & Data)

In-house

External exposition may require less "integration" since the hard integration may have already been done for the enterprise service. However, are we exposing the service in functionally the same way?

Extended SOA reference architecture
Connecting to cloud based capabilities

Consumers (external)

Service Exposure (external)

Integration

Service Exposure

API Management

Integration Hub

Consumers (internal)

Business Process
Orchestration

Business Process Management

Service Exposure (internal)

Service Registry

Service Exposure

Integration Hub

Integration

External Service Gateway (outgoing)

Operational Systems
(Applications & Data)

In-house

Cloud Based

Extended SOA reference architecture
(re-)introducing BPM as a cloud based capability

Consumers (external)

Business Process (external) — BPM

Service Exposure (external) — Service Exposure / API Management

Integration — Integration Hub

Consumers (internal)

Business Process — Business Process Management

Service Exposure (internal) — Service Exposure

Integration — Service Registry / Integration Hub / External Gateway (outgoing)

Operational Systems (Applications & Data)

In-house

Cloud Based

Extended reference architecture showing relevant IBM products

Consumers (external)

Business Process (external)
IBM BPM on cloud

Service Exposure (external)
IBM DataPower
IBM API Management

Integration (external)

Consumers (internal)

Business Process Orchestration
IBM Business Process Manager

Service Exposure (internal)

Service Registry

Integration
IBM Integration Bus

IBM Cast Iron

Operational Systems (Applications & Data)

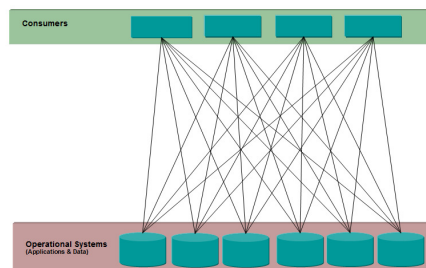*In-house*

Cloud Based

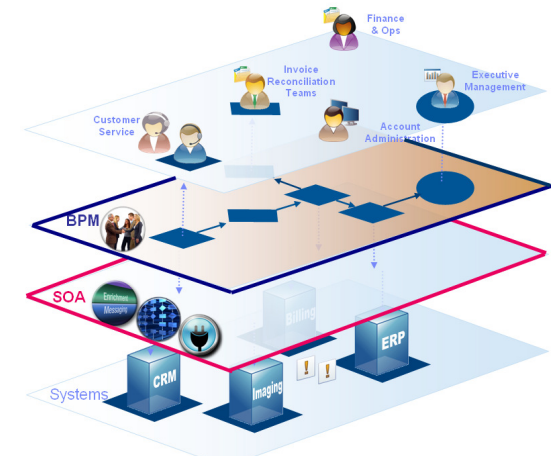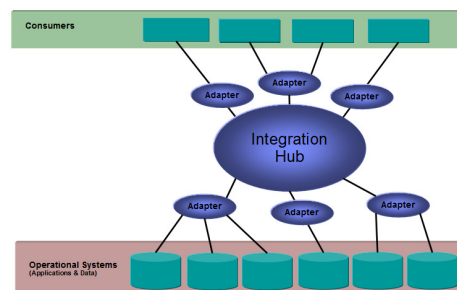# From Isolated workflow and integration and SOA to BPM

Isolated Workflow
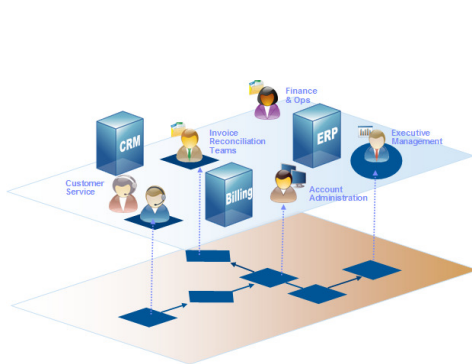
Business Process Management (BPM)
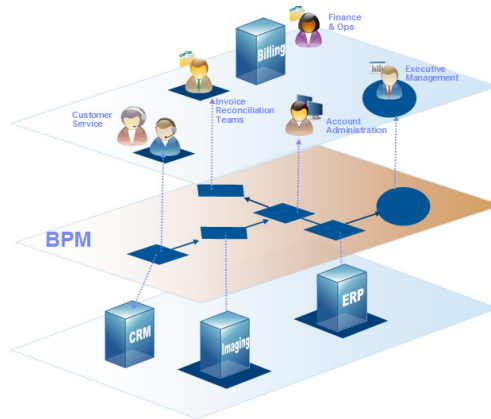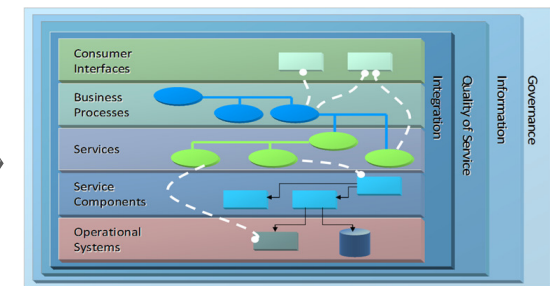
BPM + SOA

Point to Point Integration

Enterprise Application Integration (EAI)

Service Oriented Architecture (SOA)

धन्यवाद
Hindi

多謝
Traditional Chinese

ขอบคุณ
Thai

Спасибо
Russian

Gracias
Spanish

Thank You
English

شكراً
Arabic

Merci
French

Obrigado
Brazilian Portuguese

Grazie
Italian

多谢
Simplified Chinese

Danke
German

நன்றி
Tamil

ありがとうございました
Japanese

감사합니다