Place of IT Architecture in the Business Architecture

Based on *The Business Architecture Quick Guide*

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Never Stand Still

Faculty of Engineering

Computer Science and Engineering

In this course

Central theme
- – Modelling different elements of an enterprise architecture
- – Connecting business and technical architectural concepts

First part focused on modelling services
- – Technical architecture: APIs
- – Business architecture: microservices

Second part focused on modelling information
- – Technical architecture: ontologies
- – Business architecture: information resources
- – More specifically considered the role of *semantic modelling and technologies*

What is Business Architecture?

"A Blueprint Of The Enterprise That Provides A Common Understanding Of The Organization And Is Used To Align Strategic Objectives And Tactical Demands.[1]"
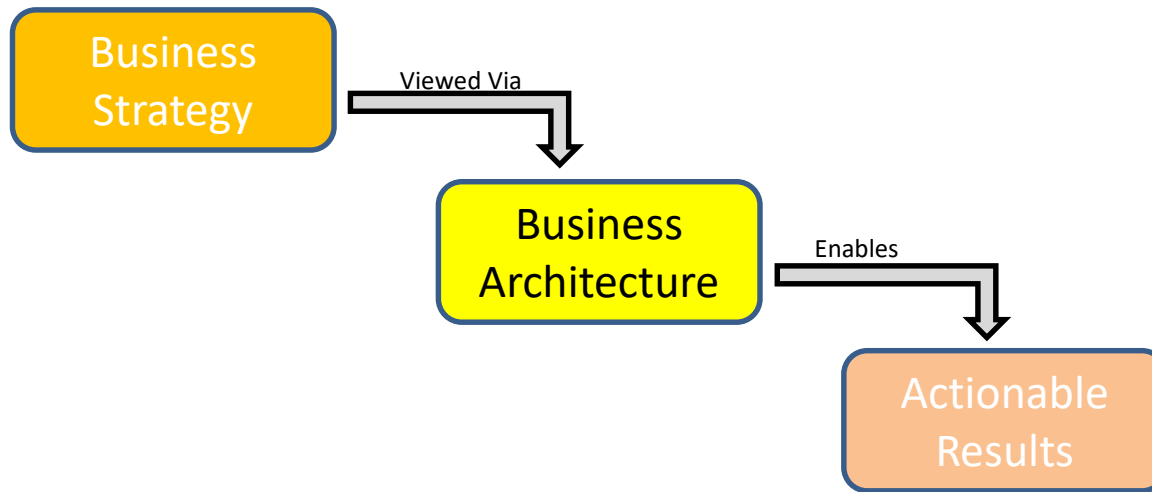
Aspects of the Business Represented by Business Architecture
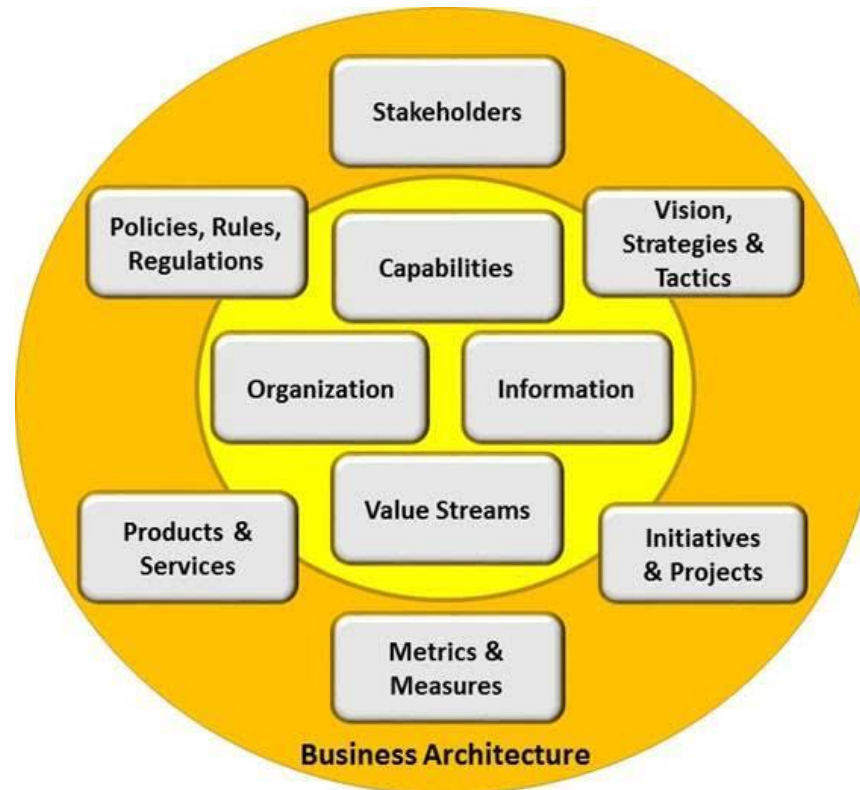
Source: *A Guide to the Business Architecture Body of Knowledge®* (*BIZB OK® Guide*)

Capability

" A particular ability or capacity that a business may possess or exchange to achieve a specific purpose or outcome"[1]

- "What" business does and not "how" it is done
- Basic building box of a business
- Can be realized in number of ways.
- A manual capability is still a capability and automating does not alter its existence, definition or business context.
- Capability map can organize different levels of capabilities starting from high level business objectives that decompose further in lower levels

Example capability:
Prediction of House Price

Value Stream

"End-to-end collection of value adding activities that create an overall result for a stakeholder"

- Value stream is represented by two components: value items (what is achieved along the way) and value proposition (Final outcome)
- Value adding activities are represented by value stream stages each of which create and add incremental value items as value stream transition from one stage to another

E.g. :- Example Value Stream for House Price Prediction
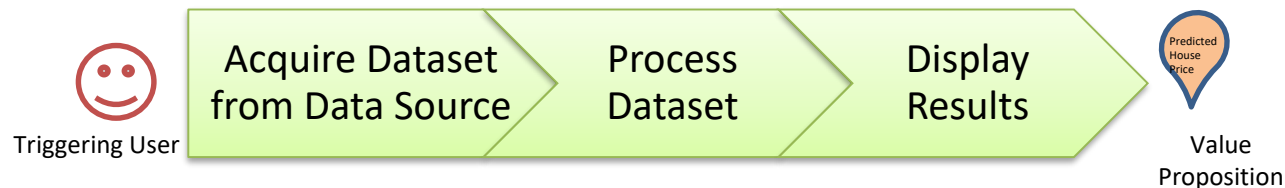
Information

"Information concepts that describes the business view of the terms, definitions, relationships, types, use and consumption"

- Avoid technology references or data management and focus on building a common vocabulary
- Accurate, timely and relevant information is crucial for a businesses' ability to make effective decisions, craft and deploy actionable strategies and ensure effective governance

Example information:
  data source, data set, data processing program, results

Organization

"Depicts business units, organizational decomposition and related organization-oriented relationships"

- E.g.- Departments, business units etc. within and organization and their relationships.
- Organization mapping can illustrate the internal business units of third-parties that have different capabilities and participate in different value streams.
- Verify the scope of the business ecosystem

Example organization decomposition:

The organization contains of an analytic department responsible for defining analytic parameters, models etc. and an IT department that implement and maintain analytic software, databases etc.

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Why Business Architecture?

<mark>Lack of shared perspective of business</mark> is the root cause for a business's inability to address a growing list of challenges timely and effectively

Value proposition of business architecture lies in its ability to address communication and collaboration roadblocks by delivering vertical and horizontal transparency to the business.

It enchases the capacity of enterprise to

- enact transformational changes – supports **"Digital Transformation"**
- navigate complexity
- reduce risk,
- make more informed decisions,
- align diverse stakeholders to a shared vision
- **leverage technology more effectively.**

Stops blaming information technology for inefficiency and addresses organization challenges at the business level

Business architecture needs to be supported by an *IT architecture*

IT architecture

Equivalent to software design at the highest level

Essential for large applications: defines "parts" of the system and how these parts are assembled

Architecture satisfies design goals e.g.:

– Extensibility (ability to add new features)

– Adaptability (accommodating changing reqs.)

– Simplicity (ease of understanding/implementing)

– Efficiency (time/space)

IT architecture description

- Different views
  - Structure
  - Behaviour
  - Information
- Specifies the different layers of abstractions that comprise the system
- Structure
  - Specifies the software components and the interaction structure between these components
  - Specifies the deployment of these components onto physical resources
  - Specifies the communication infrastructure that supports the components

IT architecture components

- Each component can be considered as an autonomous entity that delivers a particular functionality

- Each component has externally visible properties that allows it to be used by other components

- Component evolution
  - Modules
 - APIs
  - Microservice

Decomposition criteria

Decomposition into modules/components/packages etc. is of critical importance in the design activity

- *Cohesion* is the degree to which communication takes place among the module's elements
- *Coupling* describes the degree to which modules communicate with each other.

Low coupling/high cohesion is essential for managing changes

Example of an IT architecture
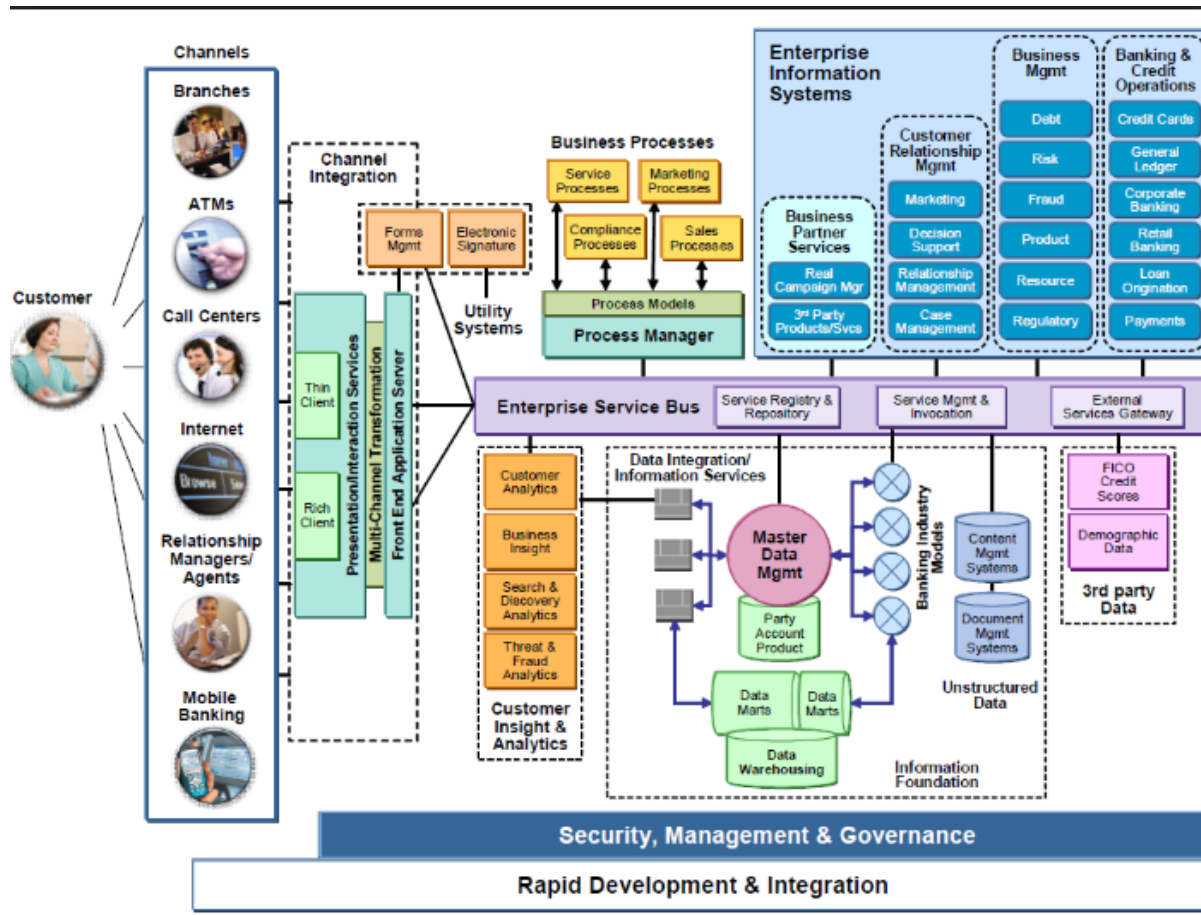
Business Architecture & IT Architecture Alignment

"Business/IT architecture alignment represents the state in which automated systems and data architectures fully enable business strategies, business capabilities and stakeholder values."[1]

- The alignment relies on the ability to translate business strategy, vision, design and requirements into deployable IT architectural concept and technology solutions.
- Business architecture supports this alignment because capabilities, value streams and information have direct, traceable and unambiguous relationships to IT applications and data architecture.
- Investments and evolution of IT architecture must have business drives to ensure their effectiveness

4 Aspects of IT Architecture Collectively Enable and Automate Business Architecture

1. **Application architecture** – specification and structural partitioning of technology-based automation into business logic, user experience and data perspective as an enabler of business architecture and strategy

2. **Data Architecture** – Integration of value specifications for qualitative and quantitative variables and their alignment with business architecture and strategy

3. **Technical Architecture** – Logical land physical interconnection of infrastructure elements to enable the deployment and management of data architecture, application architecture, and business architecture and strategy

4. **Shadow Systems** – Business owned and maintained technology not under IT stewardship but play role in business ecosystem

Benefits of Business Driven Business/IT Architecture Alignment

- IT investments are business-driven with a clearly defined business return on investment (ROI)
- The business can refocus on IT investments on stakeholder value deliver and business capabilities rather than the historic focus on systems and platforms
- IT strategy readily align to and is driven by business strategy across business unit, product and related boundaries ensuring coordinated it solutions
- IT investments focus on an overall view in terms of capability and technology-based weaknesses, gaps and related limitations
- Transformation roadmaps represent business as well as IT for the purpose of investment prioritization, change management and impact assessment

Business and IT Architecture Transformation Framework™
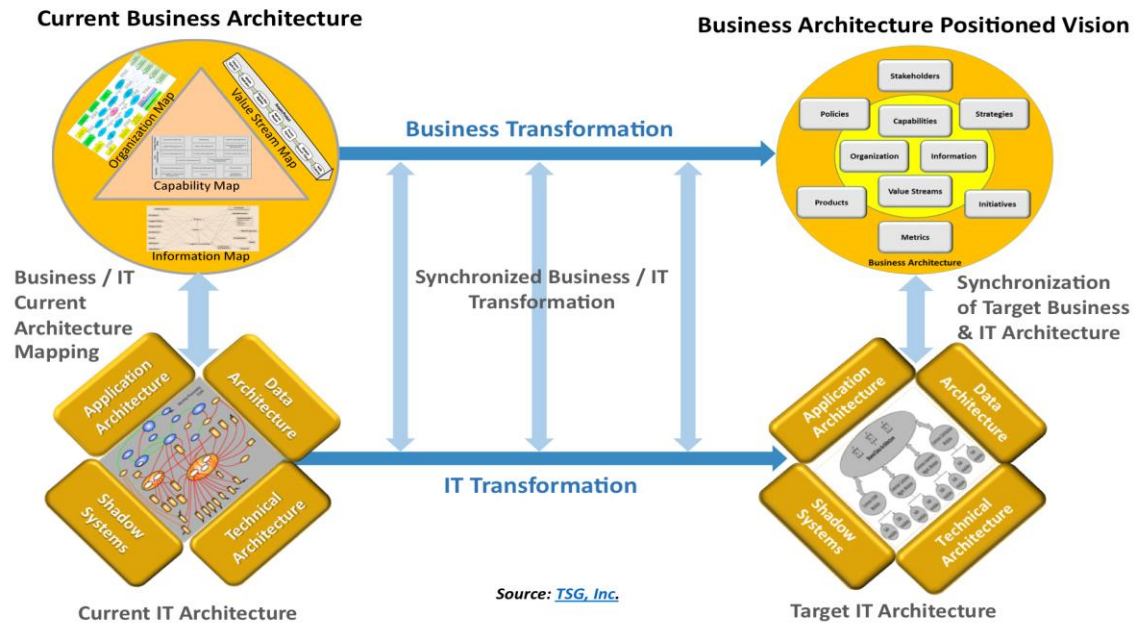
A Methodology for Business/IT Architecture Alignmnent

1. Identify the Business Processes to be Automated
2. Identify Bounded Contexts and Determine Microservices
3. Identify the Information Model for each Microservice
4. Develop Microservices in the form of Digital Interactions

Identify the Business Processes to be Automated

Draw BP Diagrams
- First draw the high level diagram
- Than work on detailed parts
- Each activity in the high level diagram can be a sub process by itself
- Detailed models should
  - Identify the roles executing each activity
  - The inputs and outputs
  - Decision points
  - Events on the boundary

Rainyday Grocer – Example*

Rainyday Grocer is a cloud-based online grocer that provides customized delivery of groceries. Their business model is targeted towards those "rainy day" moments where a person needs groceries but is unable to go the bricks-and-mortar grocery store to shop.

Business Scenario

Rainyday Grocer (RG) supports three different ordering options. A customer can:

1. Place an order with one of the approved grocery stores, send the item list, and order confirmation to RG via a web interface or a mobile application.
2. Send a grocery list to RG via a web interface or a mobile application.
3. Select from RG grocery items list and place an order.

There are two delivery options: Doorstep delivery with text message confirming delivery. Collect groceries order from one of the RG collection points.

RG does not own any inventory, supply channels, distribution channels, or data centers. They leverage other service providers for all services, and manage quality through a careful selection process and SLAs. They maintain a lean team, only 5 of whom are IT-focused, to manage their operations across five states.

RG Customer Constraints:

The customer has to accept a set of constraints to place a successful order:

- The customer must have an active account in good standing (less than five floods; i.e., negative points)
- The customer must have a valid payment method registered.
- An order is limited to 10 or less items with a cumulative weight not more than 25lb.
- RG does not guarantee any specific brands.
- There is a four-hour window from order confirmation to requested delivery.
- An order cannot include medicines or hazardous materials.
- The delivery address must be a physical address.
- The delivery address must be within 50 miles of a city center.
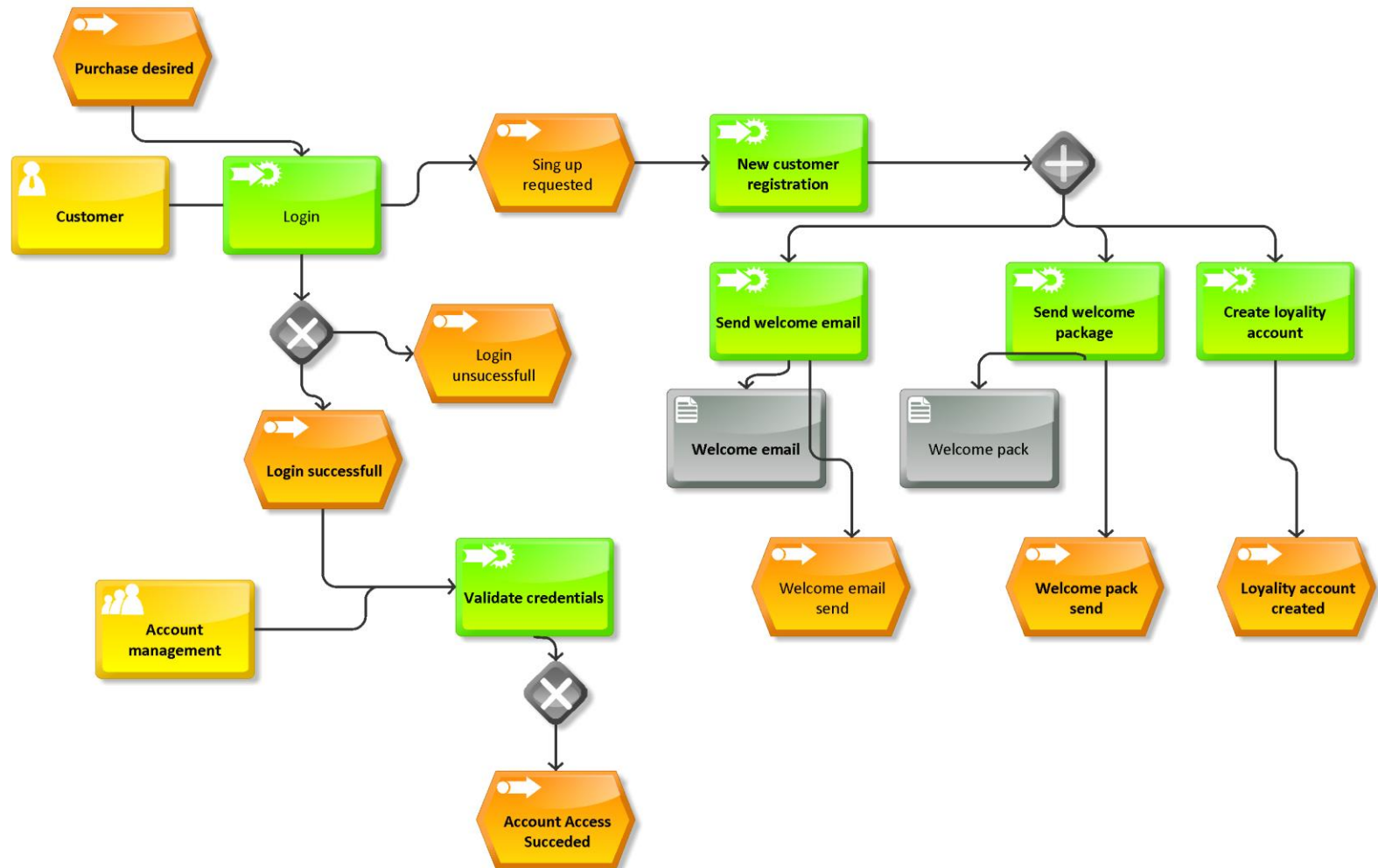- The customer must provide feedback within 24 hours, else get a flood.

High Level Order Delivery Process
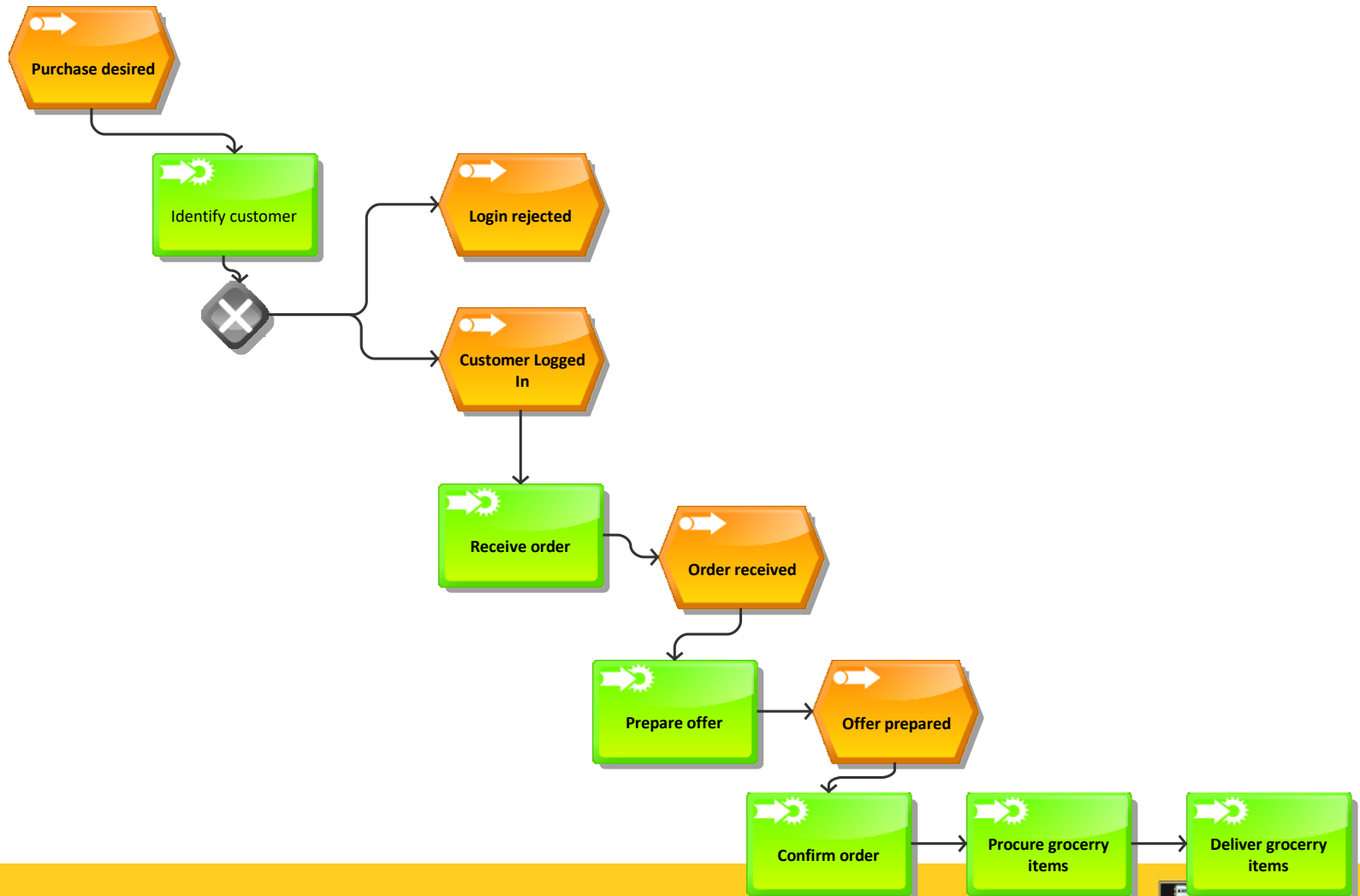
Example … Identify Customer

Identify Bounded Contexts and Determine Microservices

Who is performing the activities
- Same roles executing all the activities is a good sign of a boundary
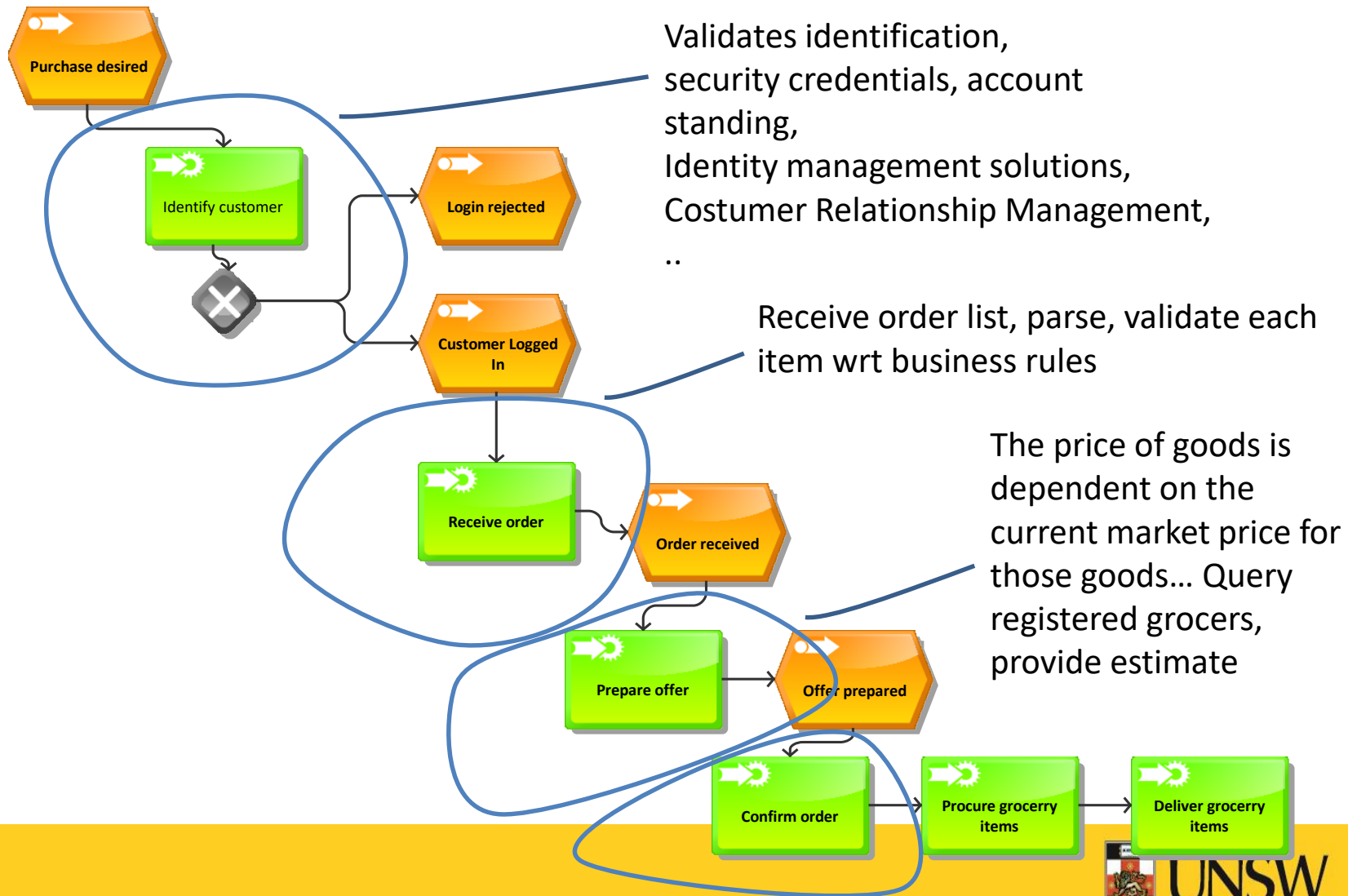- Coherent usage of vocabulary is a good sign of a boundary
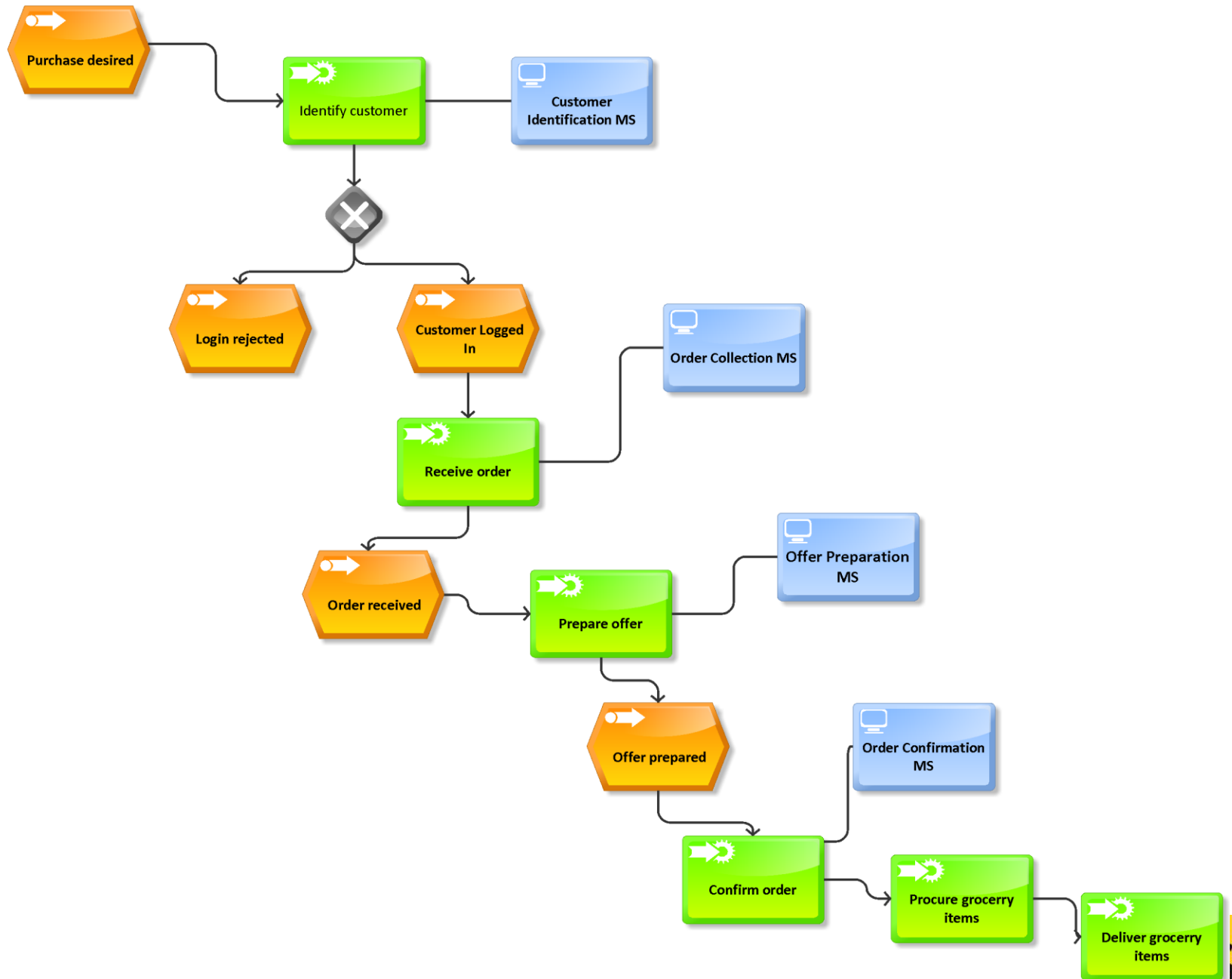
What are the inputs and outputs
- Accumulation of information in a form is a good sign of a boundary

What are the events
- Are there events that requires external parties to involve?

High Level Order Delivery Process

Purchase desired

Identify customer

Login rejected

Customer Logged In

Receive order

Order received

Prepare offer

Offer prepared

Confirm order

Procure grocerry items

Deliver grocerry items

Validates identification, security credentials, account standing,
Identity management solutions,
Costumer Relationship Management,
..

Receive order list, parse, validate each item wrt business rules

The price of goods is dependent on the current market price for those goods… Query registered grocers, provide estimate

3. Identify Information Model …

Identify data objects from business processes

– Customer / Order / Grocery item

Define relationships

– Inheritance/Composition

– Define attributes

Decide on conceptual model to represent information

– Entity relationship modelling / Semantic modelling

Define the models

– Iterative manner

– Refer back and make updates to all previous models

4. Develop Microservices

Think about the nodes in your business process
- Identify actions
- Identify changes to the information model
- Handling events from the user

Define micro services
- Focus on business actions / reflect structure of organisation
- Encourage reusability

Defining APIs models
- Inputs and outputs
- Events / Interactions

5. Models integration

Importance of integration
- – Consistency of concepts across models
- – Avoid duplication and ambiguities
- – Can lead to severe problems later

Tool support
- – Must be used across the organisation
- – Education and training issues
- – Helps maintaining the models in face of changes

Integrated frameworks

Often, business architectures and IT architectures are modelled separately

- Business architectures are modelled by business people in the context of business requirements identification and requirements engineering

- IT architectures are modelled and used by technical staff in the course of software development processes

Some integrated frameworks allow the modelling of both types of architectures
  – CAPSICUM Methodology
  – Jalapeno tool

Jalapeno – An Enterprise Architecture Modeling Tool

Jalapeno is an interactive, cloud-based modelling platform for constructing CAPSICUM framework based models.

The CAPSICUM Framework is a meta-model for a structured description of a business endeavor. It provides a template for designing and aligning a strategic business plan and a target operating model with the technology solutions that support your business operation."
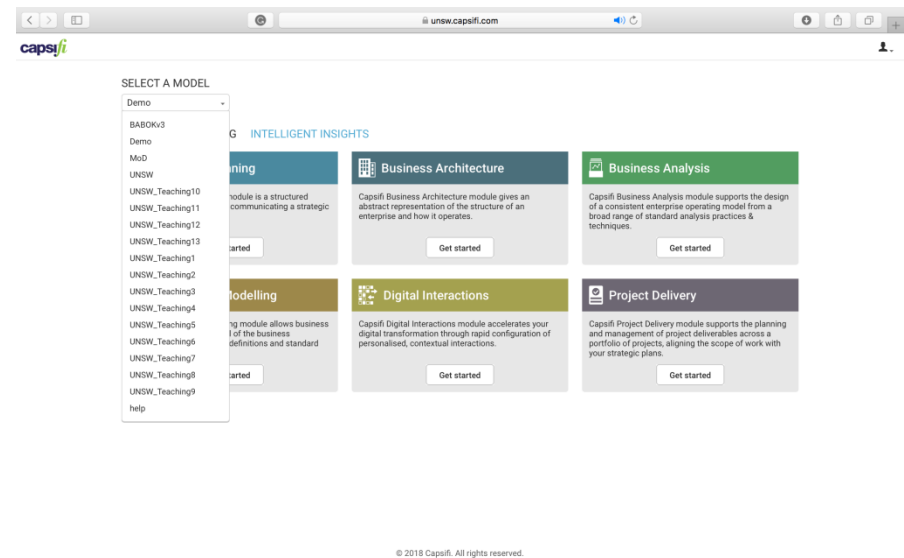
Organization: https://www.capsifi.com

Home Page
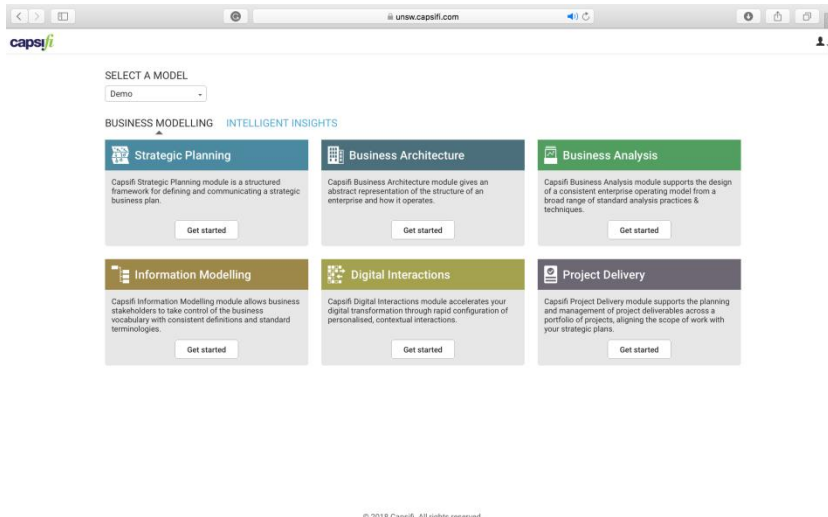
A user can select a model from the drop-down list and explore how different enterprise artefacts are represented.

Some reading

Pragmatic enterprise architecture : strategies to transform information systems in the era of big data

James V. Luisi author.

Amsterdam : Elsevier/Morgan Kaufmann, 2014

Collaborative Enterprise Architecture

Bente, S. ; Bombosch, U. ; Langade, S.

2012