Requirements in Context

Sponsored by:

Presenter:
Ramsay Millar
Business Architect
CPRE - CERTIFIED PROFESSIONAL FOR REQUIREMENTS ENGINEERING

**Expert Level**
Prerequisite: 3 Advanced Level certificates (2 certificates replaceable)

**Advanced Level** – available Modules:
- Requirements Elicitation and Consolidation
- Requirements Modeling
- Requirements Management
- RE@Agile
  September 2018
Prerequisite: Foundation Level certificate

**Foundation Level**
Prerequisite: none

**RE@Agile Primer**
Prerequisite: none
Requirements in Context

“We are a software company disguised as a Bank” – CEO Citibank

Requirements continue to grow in importance and skilled business analysts are in demand across every industry as organizations are improving their capabilities to become software development shops to survive.

Organizations who plan to survive rapid changes like cloud migration, cyber security threats, artificial intelligence, enterprise transformation projects and an aging workforce leaving with years of knowledge need to manage requirements across a wider landscape of stakeholders as the digital revolution gains in importance.

As a business architect I need to manage requirements across the entire Digital Enterprise to guarantee successful business outcomes.
Presenter: Ramsay Millar

Ramsay is an experienced global expert delivering business and technology alignment with demonstrated success by harmonizing complex domains.

Ramsay is a proven mentor, business leader, business architect, enterprise architect, business analyst, project manager and Dev Ops developer with excellent team building and leadership skills.

Ramsay is a contributing member of the Association of Enterprise Architects, International Institute of Business Analysts, Business Architecture Guild, The Open Group, and The Object Management Group.

A highly practical track record of working in the trenches with many successful business outcomes.
“Always drink upstream from the herd.”

Will Rogers
Requirements in Context

- State of Requirements in 2018
  - Requirements across the Landscape
  - Dealing with Complexity
  - Requirements Methods
  - Requirements Techniques
  - Traceability and impact of change
  - Reuse Requirements
  - Requirements Management
  - Tools
What’s wrong with the status quo?

▪ “If a requirement was misunderstood, all modeling decisions based on that requirement are invalid, the code written is also in question, and the testing efforts are now verifying the application under the wrong conditions” - Scott Ambler, former Director of Software Engineering for IBM
Top Ten Requirements Traps

1. Confusion over what is a requirement
2. Inadequate Customer Involvement
3. Vague and Ambiguous statements
4. Unprioritized Requirements
5. Building Functionality no one uses
6. Analysis Paralysis
7. Scope Creep
8. Inadequate Change Process
9. Insufficient Change Impact Analysis
10. Inadequate Version control

Karl Wiegers Describes 10 Requirements Traps to Avoid [http://processimpact.com/articles/reqtraps.html](http://processimpact.com/articles/reqtraps.html)

“Denial is not a river in Egypt”
Industry Concerns

- **Titanic** – Resulted in failure of the starboard bow
  - Requirements for rivets were substituted during build
- **F16 Fighter Planes** – loss of life and treasure
  - Inadequate software requirements and software testing
- **Banking** – fined $6 million
  - Missed one Process KPI
- **Cruise Ship Industry** – no integrated tools missed deadlines
  - 14 tools to deliver a $1.2 billion software project
- **Telecom Industry** – fined $47 million
  - Agile practice did not believe requirements are needed any longer
- **United Kingdom** – is wasting £37 billion a year on failed agile IT projects according to research by Information Age – May 2017
“68% of CIOs agree that agile teams require more architects. From defining strategy, to championing requirements to ensuring development teams stick to the rules of the game, the role of the architect is sorely missed in the agile space”

Source: https://www.outsystems.com/1/state-app-development-trends/
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Requirements impact Everyone

Line of Visibility across the entire Digital Enterprise Value Stream

- All industries
- All roles
- All outcomes
Requirements are Everywhere

- Business Rules
- Capability Requirements
- Compliance
- Data Requirements
- Decision Tables
- Financial Requirements
- Governance
- Needs
- Policy Requirements
- Process Requirements
- Quality Assurance Testing
- Software Code
- Use Cases and User Stories
- User Interface Requirements

- Application Requirements
- Architecture Requirements
- Functional Requirements
- IT Requirements
- Legal Requirements
- Projects Requirements
- QoS Requirements (NFR)
- Risk Requirements
- Security Requirements
- System Interface Requirements
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The Modern Analyst

- Deals with Complexity
- Curious and Loves Learning
- Active Listener
- Commit to Excellence with courage
- Own the outcome to ensure success
- Enable others
- Use best practice techniques and tools
- Practiced in people skills
  - Active Listening
  - Body Language
  - Communication, verbal, written, and visual
Your brain is the best tool ever

- The Six Interrogatives
- Scope and Level of Detail
- Chunking
- Abstraction
- Prototype modeling
- Reuse Frameworks
- People Skills
Dealing with Complexity

- A business model is a complex system of machines and people
  - using tools
  - organized into departments
  - using sequential processes
  - processing information for services
  - dealing with internal and external stakeholders
  - constrained by policy, business rules, and laws

- Many Views are required to communicate

John A. Zachman
The Zachman Framework™
Many Views are required to Communicate

- **One Dimension – catalogs**
  - Who dimension

- **Two Dimension – matrices**
  - Who and what

- **More than Two Dimensions - diagrams**
  - Who, what, when
Scope and Level of Detail

**Strategic** - Why, Vision, Mission, Goals, Objectives, Stakeholders, and Concepts

**Tactical** - Who, When

**Operational** - How, What, Where
The word chunking comes from a famous 1956 paper by George A. Miller, "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information" (Neisser, 1967).

- Breaking Complexity down using Cohesive Reasoning
- Chunking Use Cases scenarios, Epics, User stories
Abstraction

- An effective method is to start at a reasonably abstracted level of the skill, and then to work your way downwards using:
  - Generalization
  - Specialization
Prototype modeling

- Modeling complexity “A picture is worth a thousand words”
Reuse Frameworks

- APQC
- BABOK
- BIZBOK
- CMMI
- DBMOK
- IASA
- IEEE
- IREB
- ITSM
- PMBOK

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The “Order Taker”

- Does not verify
- Fixed ‘solution’ view
- Tell me what you want
- Tell me what you think
- Tell me what to do
- “Would you like fries with that?”
The “Methodologist”

- No Analysis
- Use all the templates
- Tick all the boxes
- Fixed “process” view
- “Agile Scrum is the only way Method!”
The “SME”

- Fixed “business” view
- Limited experience outside area of expertise
- Often lacks formal analysis training
- “We’ve always done it that way, so why change!”
The “Evangelist”

- Fixed “vision” view
- Passionate and enthusiastic
- The answer to every problem
- Can’t understand when others don’t follow
- “What’s the next shiny new thing?”
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“Code and Fix”

- We’re such smart coders that we don’t need any analysts or requirements
- The faster you begin coding when starting a new project the longer the project will take
Waterfall –1976

- Bell and Thayer Paper IEEE Conference
- Works well for simple, well-understood, short-timeframe projects
- No looping back
Spiral model for Software Development - 1985

- Barry W. Boehm, Chief scientist of the TRW Defense Systems Group
- Microsoft was an early adopter
- Birth of Agile
Agile Unified Process – 2001

- Story driven using Iterations – evolved spiral method
- Focus on the customer and quality outcomes
- Deliver high risk and high value stories first
- Promotes re-use and avoid rework
Chunking Complexity with Stories

Use Case Metrics Research 2005
https://www.researchgate.net/publication/279404900_Metrics_for_use_cases_A_survey_of_current_proposals
Agile - 2018

- Driven by epics, simple user stories using an iterative approach
- Deliver based upon customer priority and value
- Prototype and reveal software for acceptance
- Small multi-disciplined teams

**Agile Camps**

- Extreme Programming.
- SCRUM
- DSDM
- Adaptive Software Development
- Crystal
- Feature-Driven Development
- Pragmatic Programming
- Lean Development
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Key Requirement Types

- **Business Rules** – the King and Queen of requirements
  
  ![Business Rule](image)
  
  *A new customer must not place an order that exceeds $1000 USD*

- **Data Requirements** - used everywhere and are mandatory
  
  ![Data Requirement](image)
  
  *International Standard Book Number (ISBN) for Book data Classification example 978-3-16-148410-0*

- **Functional Requirements** – ensure business outcomes
  
  ![Functional Requirement](image)
  
  *A web customer must have the ability to purchase a book listed in the book catalog.*

- **QoS Requirement (NFR)** - ensure IT Operational Excellence
  
  ![QoS Requirement](image)
  
  *A Level C security incident Time lag between detection, reporting and acting upon security incidents must be LT 20 minutes*
Capability Model??

- **Trace Business Rules to Capabilities**
  - **BR** A new customer must not place an order that exceeds $1000 USD
  - **DR** International Standard Book Number (ISBN) for Book data Classification example 978-3-16-146410-0
  - **FR** A web customer must have the ability to purchase a book listed in the book catalog.
Process Scope

- Trace Business Rules to Capabilities
  
  **BR**: A new customer must not place an order that exceeds $1000 USD
  
  **DR**: International Standard Book Number (ISBN) for Book data Classification example 978-3-16-148410-0
  
  **FR**: A web customer must have the ability to purchase a book listed in the book catalog.
Business Process Modeling

- Trace Business Rules to Process Activities
  - **BR**: A new customer must not place an order that exceeds $1000 USD
  - **DR**: International Standard Book Number (ISBN) for Book data Classification example 978-3-16-148410-0
  - **FR**: A web customer must have the ability to purchase a book listed in the book catalog

Decision Modeling Notation
Use Case diagram

- **Trace Business Rules to Process Activities**
  - **BR**: A new customer must not place an order that exceeds $1000 USD
  - **DR**: International Standard Book Number (ISBN) for Book data classification example 978-3-16-148410-0
  - **FR**: A web customer must have the ability to purchase a book listed in the book catalog.

Diagram:
- Web customer «trace» order book «include» pay for order «extend» search books
Tracing a Business Rule to the User Experience

**BR**
A new customer must not place an order that exceeds $1000 USD

**DR**
International Standard Book Number (ISBN) for Book data Classification example 978-3-16-148410-0

**FR**
A web customer must have the ability to purchase a book listed in the book catalog.
Data modeling

- Trace Business Rules to Data models for AI benefit

**BR**
A new customer must not place an order that exceeds $1000 USD

**DR**
International Standard Book Number (ISBN) for Book data Classification example 978-3-16-148410-0

**FR**
A web customer must have the ability to purchase a book listed in the book catalog.
Sequence Diagram

- Trace Business Rules to Software Engineering

**BR** A new customer must not place an order that exceeds $1000 USD

**DR** International Standard Book Number (ISBN) for Book data Classification example 978-3-16-148410-0

**FR** A web customer must have the ability to purchase a book listed in the book catalog.

1. The story begins when a web customer chooses to place an order.
2. The system displays a form for placing an order.
3. The web customer chooses to search for books using the search books use case.
4. The web customer adds a book to their order list from the book catalog.
5. The web customer indicates the number of a given item they wish to order if the order is changed.
6. The web customer chooses to update their order.
7. The system calculates the subtotal for the total item by multiplying the unit price by the quantity ordered.
8. The system redisplays the form contents.
9. The web customer repeats STEPS 5 through 7 as necessary.
10. The web customer finishes adding items to the order.
11. The web customer provides their ship to and billing address including name, phone, and address.
12. The web customer chooses to go to checkout.
Class diagram

- **Trace Business Rules to Software Engineering**

  - **BR**: A new customer must not place an order that exceeds $1000 USD
  
  - **DR**: International Standard Book Number (ISBN) for Book data Classification example 978-3-16-148410-0
  
  - **FR**: A web customer must have the ability to purchase a book listed in the book catalog.
Component diagram

- **Trace Business Rules to Component Design**

  - **BR**: A new customer must not place an order that exceeds $1000 USD
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Acceptance Testing

- **Trace Business Rules to Acceptance Testing**
  - **BR**: A new customer must not place an order that exceeds $1000 USD
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  - **FR**: A web customer must have the ability to purchase a book listed in the book catalog.

![Diagram showing the flow of actions from web customer to search books, order book, and testing results.](image)
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Impact of Change???

Maintenance of requirements can facilitate impact analysis across the Enterprise.
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Reusing Knowledge

- Manage Requirements for re-use beyond the lifetime of a project
- Re-use Requirements must be clearly named and defined
- Re-use Requirements must be readily available to all stakeholders
- Re-use facilitates impact analysis for changes
- A person should be identified to manage the repository
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Managing Requirements with KPI’s

Requirements Manager - My role is ensure business needs, functional requirements, and software requirements are traceable and re-used according to business capabilities.

How can I share the impacts of regulatory requirement changes across all applications, information, and projects?

How can I manage business rules catalogs and policy changes with all stakeholders across the enterprise?

How can I share requirements reuse across many projects?
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Tools
Too many tools with no traceability
Knowledge Management Repository

- Collaborate with all stakeholders
- Store re-use facts and corporate knowledge
- Manage business and technical complexity
- Trace impacts across projects and
- Re-use promotes continual quality improvement
- Re-use avoids rework
- Re-use reduces project work 40%
- Generate documents from a database
Conclusion

Key Benefits of Managing Requirements

- Improving an enterprise approach to managing all requirements has a tremendous impact on the systems development lifecycle and the efficiency of digital technology implementation.
- There is huge opportunity in adopting a reuse approach that allows an enterprise to share consensus more rapidly using a knowledge repository containing requirements traced across the landscape.
- It’s generally accepted that “rework” consumes an average of 30% of a total project’s budget. This large amount of waste can be reduced substantially through better requirements definition.
- The benefit accrue to large and complex systems, with a high intrinsic risk.
- META Group describes the initial definition, analysis, and design as almost 40% of a project.
The CPRE is worldwide acknowledged – over 40,000 certified professionals in 70 countries

Gain the relevant skills, improve your professional profile and you will gain a higher market value.

- CPRE RE@Agile addresses RE in an agile context
- Work more efficiently with stakeholders during elicitation.
- Learn the appropriate methods for successful negotiations.
- Be familiar with different techniques for modeling and documenting requirements.
- Be more effective at managing requirements during the entire lifecycle of a project or product.
- Know the terminology of RE
- Become part of an internationally recognized community.

www.ireb.org
Knowledge Management Repository

✓ Run on leading relational databases
✓ Support visual and text modeling using database with referential integrity
✓ Use Open Standards from the Object Management Group (OMG)
✓ Support Model Driven Frameworks
✓ Be highly scalable for very large teams
✓ Provide Security and Record locking
✓ Generate documentation for all formats
✓ Be customizable to fit the purpose
✓ Support life cycle re-use from business to software development domains
✓ Have a large and Loyal User Group Community
✓ Affordable