Information Technology Architecture Certification
(...Some ideas in review...)

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Background ...

WWISA has expressed interest in exploring the development and evolution of an Information Technology Architecture professional certification.

Murray Booth - Lead Enterprise Architect, IBM New Zealand.
18 years in I.T., 8 years in architectural engagements.
Attained the IBM I.T. Architecture Certification and a serving member of the IBM Asia Pacific IT Architecture certification review board.

Architectural Heritage ...

Time passes and the advances are made :

Software Engineering

System topologies have evolved

IT Systems scale - complexity in number of components and interfaces

Rate of technology change

The need to manage systems design risk

Architectural Thinking ...

Axioms :
•**Separation of concerns**.
•**Comprehension** - complexity management
•**Translation** - design unaffected by movement in equivalent context
•**Transformation** - design unaffected by equivalent component replacement (***substitution equivalence***)

Principals (derived from Axioms) :
Modular design - interface and implementation concepts
Design portability - through abstraction of context/interfaces
Design Flexibility - accommodation of change
Intellectual control - record design in hierarchy of components - span of control
Conceptual Integrity - achieved by uniform application of a limited number of design forms (patterns ?)

Architectural Thinking ...

Enterprise to Enterprise Design

Enterprise Design

Multi system design

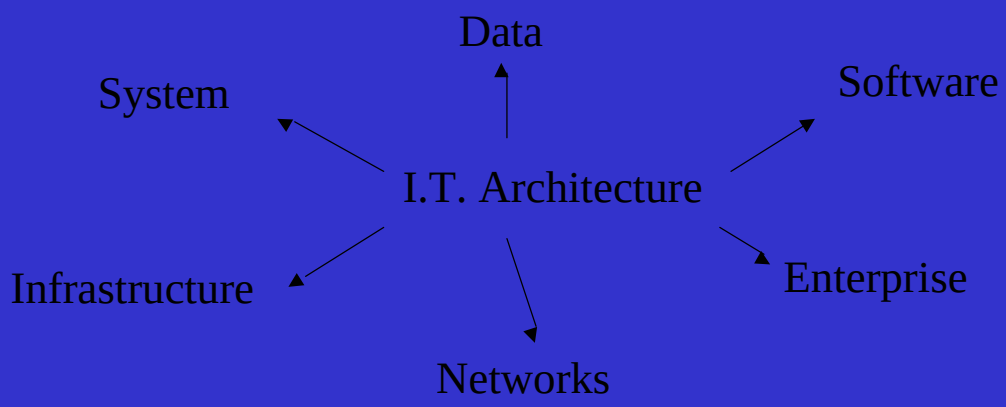
System and component design

Software engineering

Computational languages

Bits and Bytes

Working definitions for discussion



" ...A system is an entity which maintains its existence through the mutual interaction of its parts…." (Austrian Biologist Ludwig von Bertalanffy.)

Working definitions for discussion

"…Abstractly, architecture involves the description of elements from which systems are built, interactions among those elements, patterns that guide their element composition, and constraints on those patterns. (Garlan & Shaw 1996)"

In general, a particular system is defined in terms of a collection of components, and the interactions among those components. Such a system of components in turn may be used as a (composite) element in a larger system.

Information Technology Architect's value proposition ...

The value proposition of the architectural process and the presence of an architect to business outcomes can best be seen in the emerging industry recognition of the mind set needed to manage complex technology solution in sales and delivery engagements.

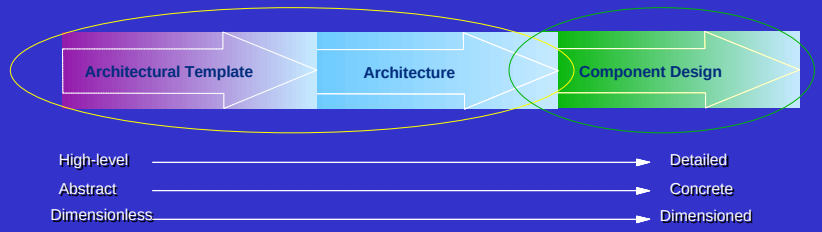
Some key value to the business world ...

Management of technical and business risk
Working in business and technology vocabulary
Manage certainty of outcome for business

Vocabulary & Views

Architecture and Design

Architecting *Designing*



Architectural Template

- ***Defines* the structural or behavioral *patterns* of a part of an architecture**
  - ✓component roles, interfaces and the standard pattern of component operations and exchanges
- Examples: 'reference architecture', 'framework', 'industry standard'

Architecture

- ***Defines* the *structure* of a solution**
  - ✓the solution components and their properties, relationships and interfaces
- Business requirements are biggest influence
- Broad scope

Component Design

- ***Used to build* the *structure***
  - ✓component detailing
- IT requirements are biggest influence
- Focused scope

Roles & Responsibilities ...

"The ideal architect should be a man [or woman] of letters, a mathematician, familiar with historical studies, a diligent student of philosophy, acquainted with music, not ignorant of medicine,familiar with astronomy and astronomical calculations."
--- Vitruvius, circa 25 BC

Roles & Responsibilities ...

"...The life of a software architect is a long (and sometimes painful) succession of sub-optimal decisions made partly in the dark…" (Philippe Krutchen)

Technical Experience
Leadership
Domain knowledge
Personnel skills
Communication
Formal management

Roles & Responsibilities ...

Distinct industry processes in an engagement ...

Distinct practices and methods in an engagement ...

Distinct roles in an engagement …

- Analyst
- Software engineer
- Architect
- Project manager
- Consultant
- Engagement Lead

Roles & Responsibilities ...

Architects are challenged to be a :

- Practitioner
- Consensus builder
- Results oriented
- Generalist
- Not just a top level software designer
- Not the project manager
- A technology expert
- Not a product expert
- Not a lone scientist

Methods & Practices ...

"…If you understand the need to create independent diagrams, solve or re-solve, systems of interaction, you will find you can create these diagrams piecemeal out of your own experience by thinking about these systems of interaction and those relationships between them…" (C Alexander 1964 - Notes on the synthesis of form)

OMG - Model Driven Architecture
U.M.L.
ROOM
Catalysis
Component Modeling Approach
….numerous others …..

Models for communication ...

•Vocabulary - definitions, terms,

•Views - recognized views of a system under study, the components of that system, and the interfaces between those components.

•Common baseline of understanding and expectation from industry participants and stakeholders - architects, builders, suppliers, and of course ….Customers !

•Process - expectations …across the industry

•Industry self governance among participating bodies.

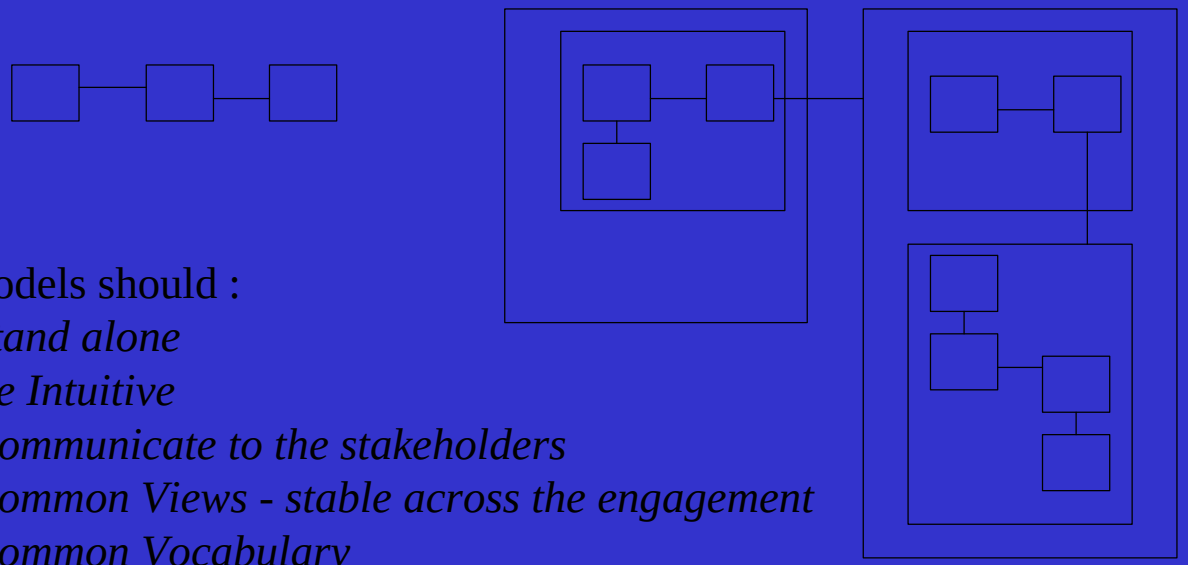
Models for communication ...

Models of Abstraction ….

- Intelligence amplifiers
- Illuminate problems
- Suggest solutions - candidate alternative designs
- Suggest components to be included in a candidate design
- Enable abstraction based design - abstract machines types/interfaces/processes/data
- Enable common view of super imposition of design alternatives - Patterns ???

“… the principal of hierarchy implies that in most, if not all architectural compositions, real differences exist among their forms and spaces….” (Ching, 1996 - Architecture - Form,Space, & Order -2nd Ed)

Models for communication ...



Models should :

- *Stand alone*
- *Be Intuitive*
- *Communicate to the stakeholders*
- *Common Views - stable across the engagement*
- *Common Vocabulary*
- *Of use in Planning/Design/Build*

Business drivers for an architectural profession ...

- Technology / system complexity
- Time pressures
- Feature complexity
- Cost constraints
- Rate of technology change creates viability risk on nearly every IT project.

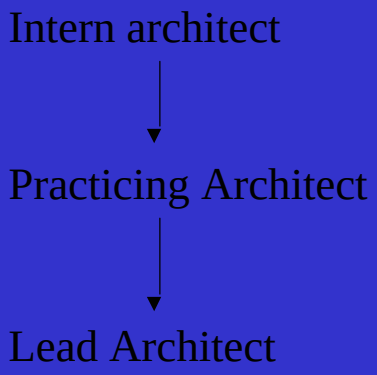
Financial risk - return on investment - the best technical solution may not be the best business solution. Architects need to be cognizant of financial Mgt.. capital planning practices.

Industry set expectations that mean experienced architects need a body of knowledge to practice successfully under these constraints by learning as a profession rather than individuals.

The need for certification …

Professional advancement …

- Awareness
- Interest
- Apprenticeship
- Practitioner
- Journeyman
- Master / Subject matter expert



The need for certification …

A Certification Process example

Sponsorship begins

Review of background and experience against a nomination guide

Preparation of submission package to the CRB

Submission of package to local geography profession leader for initial assessment

Initial feedback and review

Submission to CRB for initial document review with support from sponsor

Invitation to participate in Board interviews

Board will recommend accept / decline / qualified acceptance with feedback

Sponsorship ends

See page 14

A Certification Process example

Nomination Guide	Skeleton
Skills	
Experience	✓ Experiences all ITA's must have ✓ Project Profiles
Giveback (Professional Contributions)	✓ **Map to "Giveback" initiative (two minimum)**

- **Has IT architecture skills and experience**
- **Has appropriate technical skills and experience**
  - Exhibits technical breadth
    - Designs IT solutions involving the application and integration of a broad variety of products, technologies and services
    - Has experience/working knowledge of multiple systems platforms, multiple architectures, systems management, networking and applications design.
  - Exhibits some more detailed skills in one of several disciplines
    - Application Architecture, Data Services Architecture, Middleware and Application Services Architecture, Network Architecture, Security Architecture, Systems Management and Operations Architecture
- **Executes in a disciplined fashion**
  - Architecture work, work processes and deliverables are method-driven.

A Certification Process example

- **Nomination Guide is the "requirements document" of the ITA certification process**
  - Candidates must convincingly demonstrate that they meet those requirements
  - Board members assess candidates against the Guide requirements
- **Key sections**
  - Section 2. "Profession Overview"
  - Section 4 "Certification Criteria"

A Certification Process example

- ✓ **Has (at least some) full life-cycle experience**
- ✓ **Exhibits leadership**
  - Has technical team leader and/or a formal Project Manager experience on engagements and in proposal preparation
- ✓ **Possesses strong professional skills**
  - Has a high level of communications, consulting and client relationship skills
- ✓ **Has valued skills and experience in at least one customer industry segment**
- ✓ **Maturity**
  - 4+ years of architecting experience

Conclusions ...

The value proposition of the architectural process and the presence of an architect to business outcomes can best be seen in the emerging industry recognition of the mind set needed to manage complex technology solution in sales and delivery engagements.

The maturity of the market need for architectural approach to business and technical solution design has not yet reached the level of other architectural disciplines such as civil architecture. It will not do so until the practices, models and exhibits, and language, reach a maturity that can be valued for its opportunity cost.

Professional Certification is a step towards market maturity.