

## Putting Software Architecture in its Place *classifying the architectural species*

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### Introductions

- Software architect at BGI
  - lead software architect for the Apex portfolio management system
- Software engineering for ~18 years
  - Systems & architecture focus for ~12 years
- Background includes system software products, consultancy and applications
  - Tuxedo, Sybase, InterTrust, bespoke capital markets work
- All information systems based work
  - “real time” to me means “fast as possible please”

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## Content

- The Context
- Classifying the Architects
- Defining Each Species
- Inter-Species Relationships
- Conclusions

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## Architecture Soup

Oracle Architect    IT Architect    Enterprise Architect  
Microsoft Architect    Functional Architect    Applied Architect  
Network Architect    Storage Architect    Database Architect  
Executive Architect    Business Architect    Methods Architect  
Stream Architect    Sybase Architect    Consultant Architect  
Infrastructure Architect    Systems Architect    Software Architect  
.NET Architect    Domain Architect    Java Architect  
Data Architect    Solutions Architect    Information Architect

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## Where Did Architects Come From?

- Slow emergence of role
  - early sightings in 1970s
  - more common from 1990s onward
  - today, they're everywhere!
- Wide confusion over definitions
  - architecture vs. design?
  - architecture vs. engineering?
  - technical or management job?

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## Essence of Architecture

- Stakeholder focus
  - serving a wide constituency
  - clarifying poorly defined problems
  - identification of risks and opportunities
- Design centric activity
  - designing a system, an infrastructure, a process, ... is core to the activity
- Balancing of concerns
  - no right answer / least worst option
- System-wide concerns
  - e.g. qualities rather than detailed functions
- Leadership

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## Why Architects Anyway?

- Organisational factors
  - retain and develop talent
  - manage risk in technology environment
  - exert control over environment, vendors, ...
  - focus best engineering talent where needed
- Personal factors
  - technical career path
  - organisational gravitas and status

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## Organisational Context

- This talk is primarily about architects within an end-user organisation
- Architects live within “IT” or “IS” organisation
  - support area rather than business area
  - usually part of the COO empire
  - often seen as cost centre rather than profit centre
  - usually little understanding of technology within business areas
- Senior IT managers may or may not be ex-IT staffers
  - often seen as a “rotation” opportunity for fast track executives
- This context requires communication skills, political sensitivity & tact!

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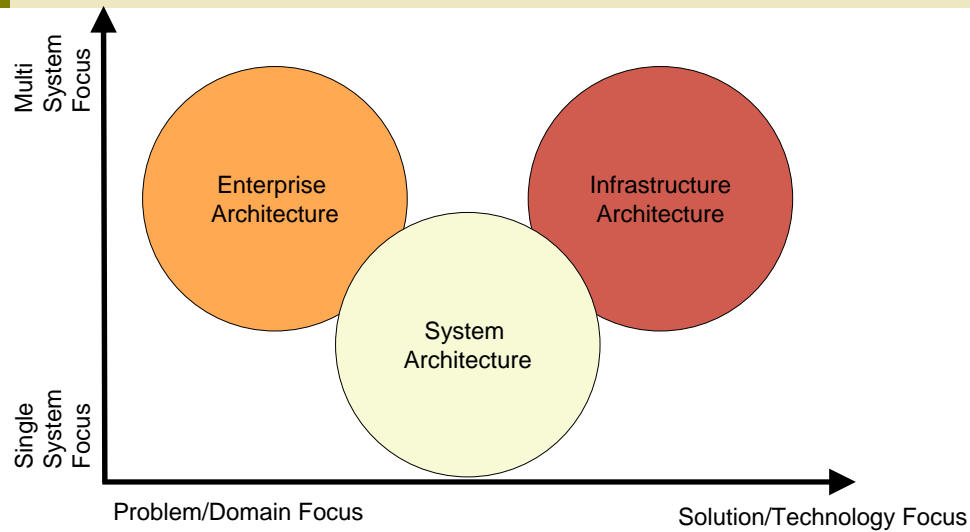
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## Common Taxonomies

- Microsoft
  - Infrastructure
  - Solutions
  - Technology (recent addition)
- IBM
  - Enterprise
  - Application
  - Information
  - Infrastructure
  - Integration
  - Operations
- Open Group
  - IT Architect
- Martin Fowler
  - Architectus Reloadus
  - Architectus Oryzus
- And many, many more ...
  - see the Internet!

## A Simple Activity-Based Classification



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## A Simplification

- Fundamentally three groups
  - enterprise, systems & infrastructure architects
- Classified by
  - focus on the domain vs. the technology
  - the number of systems considered
- Systems under consideration also implies
  - Time horizon (many systems => longer timescales)
  - Abstraction level (more systems => higher abstraction level)
  - Relationships (many systems => senior management stakeholders)

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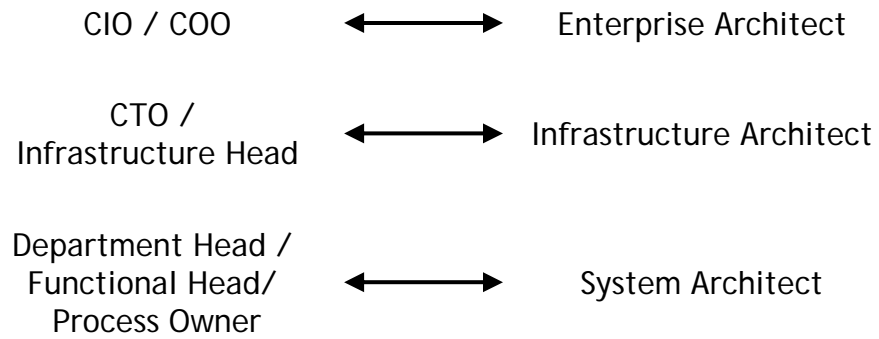
## What Architects Aren't

- Managers
  - CIO
  - CTO
  - Development manager
- Technology consultants
  - Oracle technologist
  - Java technical lead
  - BEA product specialist
  - ...

## Synonyms

- Enterprise Architecture
  - enterprise architect, functional architect, business architect, strategic architect, domain architect, stream architect, ...
- System Architecture
  - software architect, solutions architect, application architect, systems architect, technical architect, ...
- Infrastructure Architecture
  - infrastructure architect, technical architect, technology architect, database architect, middleware architect, network architect, storage architect, ...

## Organisational Context



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## Enterprise Architects

- Domain rather than technical focus
  - business alignment is a major interest
- Cross system focus
  - responsibilities, integration & interfaces
  - little interest in internal workings
  - oversight rather than design (“governance”)
- Long term (strategic) view
- Usually ex-system or infrastructure architects or ex-business analysts

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## Enterprise Architect Activities

- Functional (business domain) modelling & system specification
- Corporate data modelling
- EA framework modelling and management
  - current and future state modelling
  - Inventories (“portfolio management”)
- Technology Strategy
- Integration architecture and design
- Organisational technical standards
- Assessment / oversight / governance

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## Enterprise Architect Example Methods and Tools

- Modelling
  - UML, Archimate (possibly), B&L
  - Architecture viewpoints (possibly)
  - BizDesign Architect, CaseWise, RSM
  - PowerPoint, Visio and Excel
- System Specification
  - QAW style analysis (possibly)
  - CBAM style analysis (possibly)
- EA Framework usage
  - Frameworks (TOGAF, Zachman)
  - EA toolsets (e.g. Trous Architect)
- Information Architecture
  - Metadata repositories (e.g. ASG Rochade)
- Inventories
  - EA inventory products (e.g. Metaverse)
- Assessment
  - ATAM (possibly)

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## System Architects

- Balance of domain and technical interest
  - both are crucial to building good systems
- Single system focus
  - function and internal design of “their” system
  - system wide concerns
  - interested in other systems primarily as “black boxes” (dependencies)
- Short to medium term view
  - know where they think they’re going
  - but expecting lots of change along the way
- Almost always grown from developers

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## System Architect Activities

- Architectural design and modelling
- Technical standards
- Prototyping
- Software and database design
- Reviewing (design, implementation, testing, ...)
- Assessment (own and other systems)

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## System Architect Example Methods and Tools

- Architecture & Design
  - Domain driven design
  - Styles and patterns
  - ADD (possibly)
  - Viewpoints and Perspectives & V&B Viewtypes (possibly)
  - QAW style analysis (possibly)
- Modelling
  - UML, ERD, B&L
  - Viewpoints, V&B Viewtypes
  - MagicDraw, Together, RSM
- Development
  - IDEs, usual development tools
- Assessment
  - ATAM (possibly)
- Reviewing
  - Inspections, reviews, ...

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## Infrastructure Architects

- Technical rather than domain focus
  - broad understanding of business area priorities
  - deep expertise in technology domain
- Cross system focus
  - providing services to many applications
  - relationships often via SLAs
- Long term (strategic) view
  - simplicity, standardisation, stability, cost management
  - roadmaps and vendor management

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## Infrastructure Architect Activities

- Infrastructure Environment Design
- Technology Strategy
- Technical Standards
- Reviews of Projects
- Consultancy to Projects
- Vendor Liaison and Management
- Project Management

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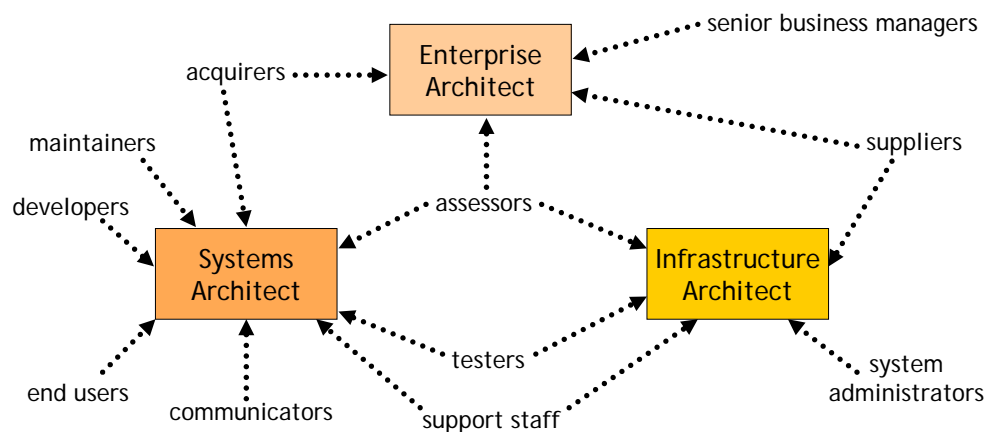
## Infrastructure Architect Example Methods and Tools

- Informal Modelling Tools
  - Visio, PowerPoint, Excel
- Infrastructure Environment Design
  - QAW style analysis (perhaps)
  - CBAM style analysis (perhaps)
- Domain or Vendor Specific Tools
  - Cisco, Oracle, Sun, ... planning or design tools
- Documentation / Communication Tools
  - Wikis, SharePoint sites, PowerPoint, ...

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## Stakeholder Relationships



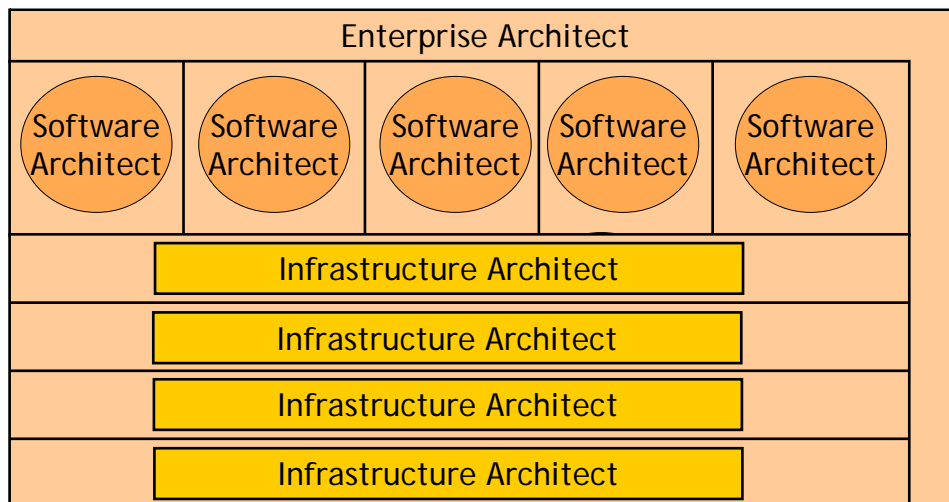
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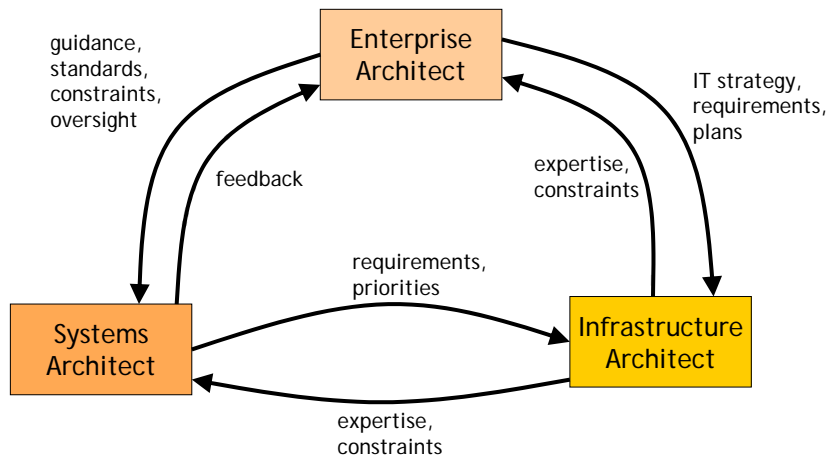
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## Architect Relationships



## Interactions



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## Interactions: Enterprise and System Architects

- Enterprise architect provides system architect with ...
  - functional architecture
  - corporate data model
  - integration architecture / design / standards
  - security / HA / BCP standards
  - technology strategy and standards
- System architect provides enterprise architect with ...
  - feasibility/usefulness assessment of ideas
  - cooperation in implementation
  - inputs to corporate standards and artefacts

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## Interactions: Enterprise and Infrastructure Architects

- Enterprise architect provides infrastructure architect with ...
  - technology strategy
  - business priorities
  - requirements for shared infrastructure
  - rollout plans
- Infrastructure architect provides enterprise architect with ...
  - product evaluations and certifications
  - technical feasibility reviews
  - cost estimates
  - vendor and market information
  - emerging technology briefings

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## Interactions: Infrastructure and System Architects

- Infrastructure architect provides system architect with ...
  - application design / reviews
  - technology consultancy / training
  - infrastructure design
  - cost estimates
  - product selection
  - likely or known risks, problems or limitations
- System architect provides infrastructure architect with ...
  - deployment view
  - rollout schedule
  - non functional requirements
  - budget

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## Conclusions

- The architect has become established in many IT organisations
  - many people with the title, so confusion over scope
- Useful to consider breadth and focus to classify architects
  - Single system vs. multiple systems
  - Domain vs solutions focus
- Three main groups of architects
  - Enterprise architect
  - System architect
  - Infrastructure architect

## Conclusions

- Enterprise architects
  - set the context for system and infrastructure architects
  - tend to face off to senior management (direction, strategy, future state)
- System architects
  - responsible for single systems, within the EA master plan, using services designed by infrastructure architects
  - tend to face off to heads of business or function who want their system
  - key member of system development team
- Infrastructure architects
  - provide cross system infrastructure services (storage, compute, network)
  - work to priorities and direction set by enterprise architects
  - responsible to CIO / CTO for infrastructure provided

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