Enterprise Architecture Maturity Assessment
Checking and Improving Organisational Health

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Agenda

• Introduction
  • Speaker
  • Audience

• Understanding the Context
  • Enterprise
  • Enterprise Architecture
  • Architecture Cycle

• Overview of Past Work
  • Maturity Assessments
  • EA Maturity Assessments

• Getting the Balance Right
• Understanding Dependencies
• Bringing in Objectivity
• Benchmarkability
• BEAM
• Value in Specialist Appraisals
• Conclusions
The Speaker

- Enterprise Architecture & System Engineering
  - Chief / Lead / Principal / Practitioner / etc
  - Strategist
  - Mentor / evangelist / etc
  - Auditor

- CMM-CMMI adoption background across the maturity spectrum

- EA Maturity Appraisal Background
  - Designer and Lead Appraiser for the first ARC-compliant (thus PII-supported and objective) EA Maturity Appraisal
  - Developed first completely objective (PII-based) EA-appraisal framework
  - Developed benchmarkable EA-appraisal framework
  - Regular speaker on the subject
    - CMMI Technology Conference and User Group
    - Open Group Architecture Practitioners Conferences
    - EA Summits

- Visiting Faculty with the IBM Rational University, an ex-Principal with a Rational Gold Partner and mentor to IBM staff consultants
  - Similar credentials in context of TOGAF and CMMI

- Author/co-author of a couple of dozen works including
  - Book
  - The Rational Edge cover feature
  - Estimating use-case driven iterative development for "fixed-cost" projects
  - Other Articles and Proprietary Papers
The Audience

- Who among you
  - Are Enterprise Architects
  - Understand Enterprise Architecture
  - Manage Enterprise Architecture
  - Work for organisation that “does” EA
  - Manage Enterprise Architects
  - Have assessed EA
  - Are looking to assess EA

- You can interrupt to seek clarification or share thought
Part-1

Enterprise Architecture
What is an Enterprise?

- Merriam-Webster Online
  - a unit of economic organization or activity

- Cambridge online dictionaries
  - an organization, especially a business, or a difficult and important plan, especially one that will earn money

- TOGAF FAQ
  - any collection of organisations that has a common set of goals and/or a single bottom line
What is Architecture?

• Etymologically (from Greek)
  • *The craft/output of the master-builder (archi-tekton)*

• Merriam-Webster Online
  • *the art or science of building ; specifically : the art or practice of designing and building structures and especially habitable ones !!!!
  • *the manner in which the components of a computer or computer system are organized and integrated*
IT Architecture

  - The fundamental organization of a system, its components, their relationships to each other and the environment and the principles governing its design and evolution
Architecture

• Generalising on the ANSI definition we get the following back-definition

• Architecture of a «a thing»

  • The fundamental organization of «a thing», its components, their relationships to each other and the environment and the principles governing its design and evolution

• This fits with etymology and generally understood sense of the term

  • Organization and integration of constituents of «a thing» that make «a thing» fit for purpose, by design
Basic Architecture Cycle

- The Master Builder (MB) ‘conceives organisation and integration of constituents’ so the whole is fit for purpose
  - MB ‘develops’ architecture

- MB (usually) articulates its concepts through a set of abstractions / models
  - MB creates ‘architecture artefacts’

- The builders build according to MB’s plans
  - Builders ‘implement’ architecture / ‘comply with’ architecture

- MB oversees builders fidelity to its plans
  - Architect ‘provides governance’ to implementation
Enterprise Architecture

• Expanding “Enterprise” and “Architecture”
  • The fundamental organisation (i.e. arrangement) of any collection of organisations (i.e. institutions/teams/bodies) that has a common set of goals and/or a single bottom line, its components, their relationships to each other and the environment and the principles governing its design and evolution
  • i.e.
    • Fundamental arrangement of collection of teams/institutions with common set of goals and/or simple bottom line +
    • Components of such Arrangement +
    • Relationships of these Components to each other and the environment +
    • Principles governing design and evolution of such Arrangement
Operating Model

- Supports Architecture Cycle
- Provides Governance
Does any organisation mean an Enterprise?

- The following slide shows distribution of Education, Employment and related functions in the British Government between 1988 and 2007
- Can you spot the Enterprises?

Acknowledgement

Taken from
- Amit Bhagwat, Role of Beacon Architecture in Mitigating Enterprise Architecture Challenges of the Public Sector
  In
In the last slide

• If you read and followed everything then
  • You have commendable eyesight and gift of quickly assimilating details

• Or
  • You were a contributor / witness to this and perhaps made a living out of the frequent redefinitions

• If you did not grasp the slide in its entirety then
  • You are close to the average citizen who did not comprehend most of these reorganisations either
Conclusion

• To become an effective enterprise
  • *It is important for an organisation to have a common goal, specific enough to purposefully work towards as a united and coordinated body*

• Enterprise architecture can help in this
  • *If specific purpose and desire to work as coordinated body exists*
The UK DWP has its stated goal

- To promote opportunity and independence for all through modern, customer-focused services

Is this an example of specific purpose to work towards as a coordinated body?

Does this statement pass the ‘negation test’
- *i.e. can a sensible benign organisation be otherwise*
  - We Do Not promote opportunity and independence for all
  - We Do Not provide modern, customer-focused services
  - We do not desire to achieve the former through the latter

In short, going by the goal stated above,
- The UK DWP is NOT an Enterprise
What of EA of a Non-enterprise?

- An organisation that is collection of a number of sister enterprises can survive and even thrive by leveraging on patterns
  - Provided that it tries not to act like one enterprise, when it is not

- An organisation that is a fraction of an enterprise usually lacks salvation
Who owns EA

• Who owns EA in your organisation? Why?

• Typically,
  • ICT architecture is owned by C(IC)TO
  • ICT enables IS/IM
  • IS architecture is owned by CI(S)O
  • So CTO enables/supports CIO
  • IS enable Enterprise
  • CIO enables/supports CEO

• So
  • Enterprise Architecture should be owned by CEO
Part-2

Maturity
Maturity

• Where did it come from?
  • It came from desire for predictability

• Who needs it?
  • All need it
  • However its need is felt more with greater
    • Novelty
    • Mediocrity (limit on choosing able providers)
    • Risk of annihilation

• These same motivators were early drivers for EA
Early inspirations

- staged quality grid
  - Philip Crosby

- IBM maturity grid
  - Radice et. al

- Both based on similar principles
  - Associate quality with attributes or subject categories, which when disrespected hurt the most in terms of expense of non-conformance.
  - Assign a scale to gauge them (5-stage / point scale in either case, one of the stages / points referring to ‘no conscious effort’).
Where does Quality come from?

- success of TQM in more matured industry sectors led to the understanding that
  - Quality of a product is largely governed by quality of process used to develop and maintain it
Maturity & Maturity Level

- Maturity
  - Extent to which a specific process is explicitly defined, managed, measured, controlled, and effective

- Maturity Level
  - Well-defined evolutionary plateau toward achieving a mature process

From CMM Documentation (remains applicable in CMMI)
Early elements of CMM

- **1987**
    - indicated what aspect to incorporate / look for in a process, rather than defining a process itself
    - The maturity questionnaire comprised of 85 process questions complemented by 16 technology stage questions
      - *In practice though, evaluators usually kept to the 85 process questions and the technology stage questions largely remained ignored as out of scope*
    - Process
      - Not Mature
      - Not Objective: expert judgment, which was neither universal nor unique.
      - Not universally applicable

- **1988**
  - *Software Capability Evaluation training (small module)*
    - The first step towards normalizing the experts’ perception was

- **1989**
  - *Managing the Software Process: Book by Watts Humphrey*
Finally

- 1993
  - SW-CMM v1.1

- 1995
  - CAF
    - Appraisal Framework

- Mid 1990s
  - Separate Internal Assessment and External Evaluation Methods

- Late 1990s
  - X-CMMs
    - DoC Architecture Maturity Model
  - Move towards CMMI with complementary representations and additional process areas
Part-3

Architecture Maturity Models
US Department of Commerce ACMM

- Characteristics highlighted
  - IT Architecture Process
  - IT Architecture Development
  - Business Linkage
  - Senior Management Involvement
  - Operating Unit Participation
  - Architecture Communication
  - IT Security
  - Architecture Governance
  - IT Investment and Acquisition Strategy

- Subjective
- Governance Focussed
- Insufficient
- Did not follow basic concepts of controlled rigour and PII-based objectivity, as had matured in CMM-CMMI
  - Simply hijacked the term CMM
US NASCIO

- Characteristics highlighted
  - Architecture Planning
  - Architecture Framework
  - Architecture Blueprint
  - Communication
  - Compliance
  - Integration
  - Involvement

- Subjective
- Program-focussed
- Insufficient
- Did not follow basic concepts of controlled rigour and PII-based objectivity, as had matured in CMM-CMMI
  - *Simply hijacked the term CMM*
CMM(...) Concepts

- Maturity
- Maturity Level
- Process Area
- Practice
- Practice Implementation Indicator
Process Areas and Practices

- **Process Area**
  - Identifies a cluster of related activities that, when performed collectively, achieve a set of goals considered important for establishing process capability at a Maturity Level

- **Practice**
  - Activity achieving implementation of PA and assisting in its institutionalization, or infrastructural feature assisting this

- Practices belong to and enable Process Areas
Objectivity

• Unlike a perception-based assessment, an objective assessment looks for *Practice Implementation Indicators (PII)*.

• PII may be classified as:
  • *Artefacts*
  • *Statements/Affirmations*

• From an objectivity perspective, Artefacts are more important than statements and the statements by themselves are inadequate PII.
Practice Implementation Indicators

- Appraisal Requirements for CMMI (ARC) framework
  - *Is basis for all CMMI Appraisals and methods they use, including SCAMPI* (Standard CMMI Appraisal Method for Process Improvement)
  - *Categorizes PII*s as:
    - Artefacts
      - *Direct (type A PII)s*: The tangible outputs resulting directly from implementation of a practice
      - *Indirect (type B PII)s*: Artefacts that are a consequence of performing a practice or that substantiate its implementation (e.g. minutes of meetings, etc)
    - Statements (also referred to as Affirmations or Type C PII)s
      - *May come in the form of a written comment or oral statement* (as in interview, workshops, etc) from those who implement the practice
  - *From an objectivity perspective, the emphasis lowers going from type A to type C*
Rating Practices

- Practices are rated for their implementation as:
  - **Fully Implemented (FI)**
    - Direct artefacts present and appropriate
    - Supported by indirect artefact and/or affirmation
    - No weaknesses noted
  - **Largely Implemented (LI)**
    - Direct artefacts present and appropriate
    - Supported by indirect artefact and/or affirmation
    - One or more weaknesses noted
  - **Partially Implemented (PI)**
    - Direct artefacts absent or judged inadequate
    - Artefacts or affirmations indicate some aspects of the practice are implemented
    - One or more weaknesses noted
  - **Not Implemented (NI)**
Generic Approach to Objective Assessment

- Define Maturity Levels
- Define Practices and associate them with Maturity Levels such that
  - A practice is placed at a level where the evolutionary development expected of the level and of levels above it needs implementation of the practice
- Evaluate Maturity Level Achieved based on relevant practices implemented
Maturity Level Verdict

• A level is considered achieved when all Practices that represent all levels, up to and including that level, are fully implemented.

• A level may be considered achieved conditionally when all Practices that represent all levels, up to and including that level, are fully or largely implemented; the condition being that weaknesses, noted in the verdict *Largely Implemented*, are eliminated.
Capability vs. Maturity Level

• Objective assessment of implementation is made at the granularity of Practice

• Practices are associated with Level adjectives

• Hence when all Practices at a Level are Fully Implemented, the organisation is at that (or above) Maturity Level
  • So long as all Practices at all Levels below are also Fully Implemented

• Practice Clusters (usually called PAs) may include practices where all practices within the cluster representing up to say Level x are Fully Implemented
  • That Practice Cluster / PA will then be at Capability Level x
  • However, for the organisation to be at Maturity Level x, all practices that represent all Levels up to x, however clustered, need to be Fully Implemented
  • Makes sense, particularly in speciality appraisals such as EA Maturity Appraisal, where all practices defined are pertinent to the speciality (e.g. EA)
Early Architecture Maturity Techniques

- Do not go down to the fundamental of assessment – Practice
- Do not / can not look for PIIs and are not objective
- Are based on averaged perception rather than evidence
- Refer to Characteristics / Process Areas - that are essentially logical clusters of practices
  - Without defining practices that they represent
- Define levels and associate them with adjectives
  - Without being able to link the adjectives with what is implemented
  - Without being able to build an evolutionary path up the levels ladder
Part-3

Benchmarkability
Benchmarkability

- Ability of a model to reliably benchmark against
- Provides means of reliable
  - year-on-year comparison with self
  - comparison with peer organisation
  - comparison among suppliers
  - standard setter for critical suppliers
  - threshold for success of program with given complexity
  - measure of highest complexity that can be safely handled
A benchmarking appraisal method must have precise specification for the media & procedure used for conducting appraisal, pre and post appraisal activity, and the procedure for data analysis-verification-management. The appraisal team must be carefully chosen based on precise criteria and the leader of this team must have demonstrated ability to appraise effectively, exhaustively, corroboratively and objectively.
Part-4

BEAM Model
BEAM Model

• Stands for
  • *B Enterprise Architecture Maturity Model*
  • *B Strands for*
    • Benchmarkable - When applied with precision and rigour
    • Bhagwat - to satisfy vanity of its developer. Generalised use for both benchmarking and non-benchmarking appraisals.
      • *Non-benchmarking appraisals*
        • can be used for spot-checks
        • can also give trend of progress (or otherwise) of an organisation if conducted frequently (typically annually or more frequently)
Characteristics of BEAM Model

- Benchmarkable, though can be applied with lower rigour / for specific process areas, for conducting spot-checks

- Comprehensive
  - Takes into account Engineering, Operations and Support Areas ignored by earlier EA maturity models
  - Takes into account practice and process area dependencies
  - Allows Process Area Capability evaluation

- Consistent
  - Is faithful with CMMI-ARC and thus reliably objective even in non-benchmarking mode

- Progressive
  - Provides standard format roadmap for the organisation assessed, based on weaknesses identified and taking into account their effect on one another
Illustration of a Roadmap

Understand and engage more closely with the Business

Manage, relate, quantify and develop Requirements

Build Configuration and Change Management capability

Build ADM

Build Non-functional specialities

Attain role consistency / mapping

Broaden governance beyond Consent and Compliance

Build strategic capability within the team and benchmark it periodically
Conclusion

- Effectiveness of Appraisal depends on
  - Clear objectives communicated and owned across the organisation being appraised
  - Clarity, sufficiency of definition and repeatability of the appraisal mechanism
  - Objectivity coupled with pragmatism
  - Dependencies across Process Areas and Practices, and their cumulative effect taken into account
  - Results presented with different perspectives, purposes and granularity
  - Results fed into strategy and reflected in improvement roadmap
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