Forethought:
The Unspoken Foundation of Evolution

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Architectual Vision

- Good architecture is timeless and pays dividends
- Bad architecture creates long term pain and expense

Introduction

- not aesthetics
- functionality
- performance
- long term costs

“Chance favors the prepared mind” – Louis Pasteur

- Flexible systems do not need to be accidents
- Pre-adaptation in biology is accidental; in IT it should be planned

Aesthetics is misunderstood

- beauty is merely a shorthand
- true engineering meaning – efficiency
- examples:
  - 1930's "streamlining"
  - 1969 – LM
  - Arthur Clarke's Discovery

"The Hidden Presumption"

- We know where we are going before we get there
- "The Hidden Hand"
- result:
  - Expert practitioners achieve good results consistently
  - Others are less fortunate
  - As John Zachman noted in keynote: "Alchemy, not chemistry"

One oft unnoted difference –

- The meaning of evolution in a systems context

Evolution:

- Somewhat overused word
- Multiple meanings
- “Sequence in time”
- Biological usage:
  - Speciation/Decimation
  - Random process, branching, many failures

The biological paradigm is not a good analog for IT

- too wasteful
- too random
- inefficient

"Sequence over time" is more useful

- Needs change over time
- External conditions change over time

Why don't we learn?

- Lessons are too often retrospective
- Architecture is prospective
- Future
  - Concerns
  - Hopes
  - Aspirations

Consider the stakeholders

- Users
- Managers
- Developers
- Who is the stakeholder for the “future”

The importance of studying failure

- Failures are predictive of failure
- Why something failed is more instructive
  - What failed?
  - Why it failed?
  - Consequences?

Architecture – Infrastructure for the future

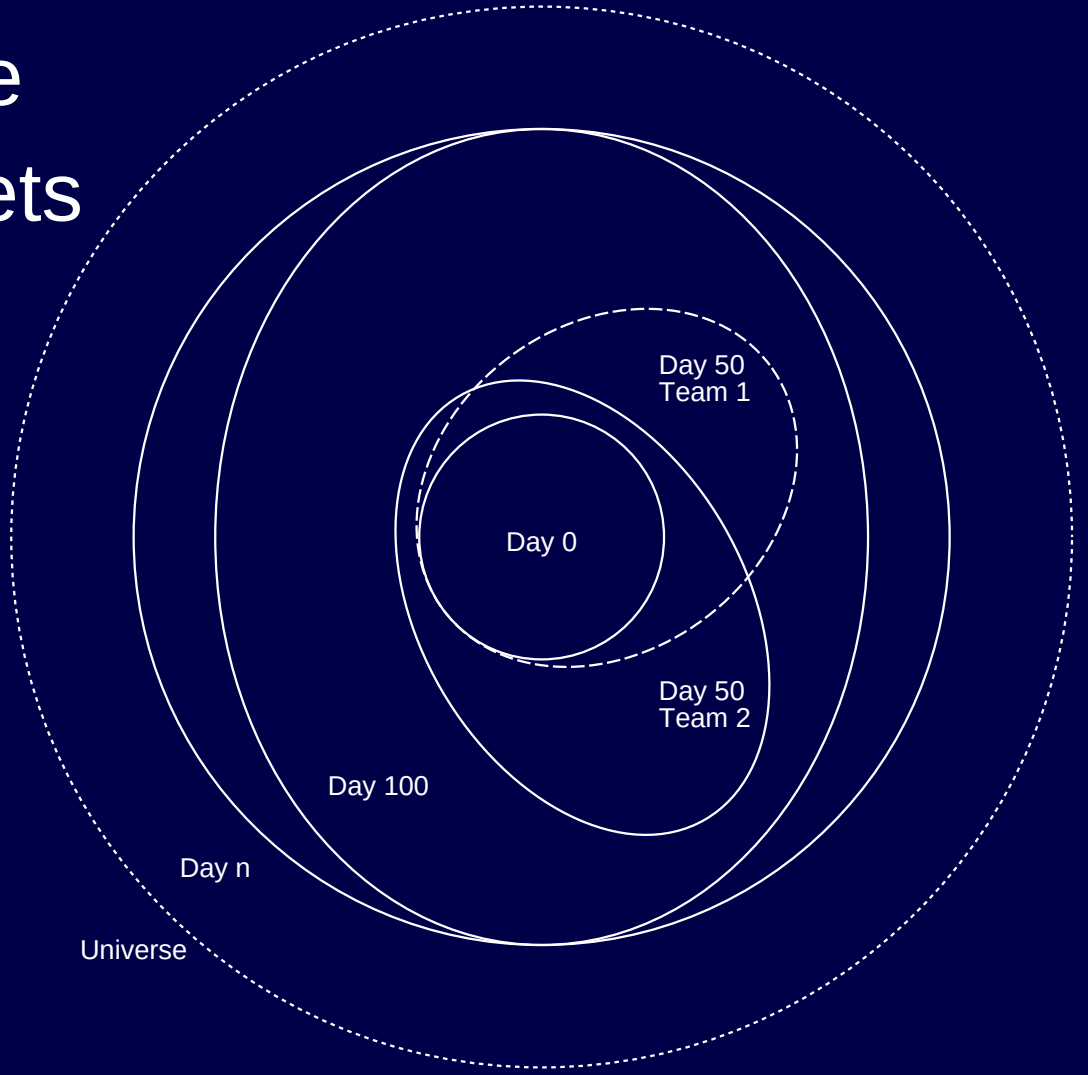
- "Architecture limits what a system can be"
- The Architect is the stakeholder for the future
- Approximations without understood limits are dangerous
- Architecture reduces risks and costs:
  - during development
  - during testing
  - during later revision/enhancement

Architectural Goal

- Non-disruptive enhancement of system over unbounded time
- “The Noble Spiral”

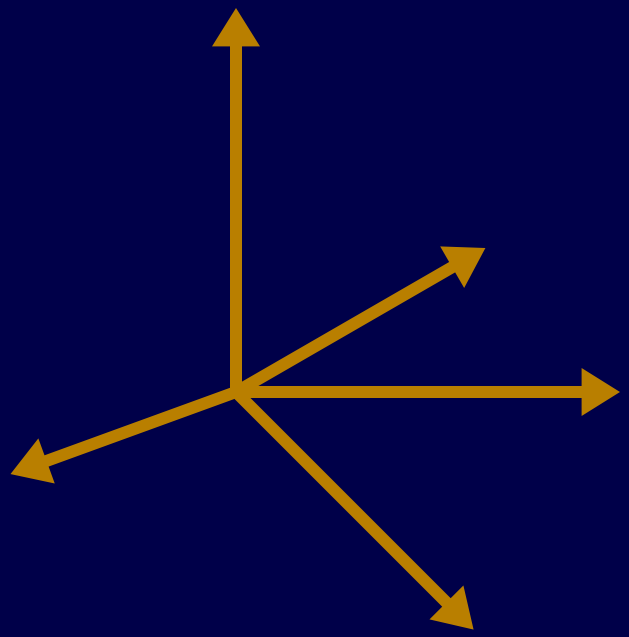
Spanning the Space

- Bounded universe
- Successive subsets
- No supersetting
- Disjoint subsets possible



Separate Independent Issues

- Minimize casual linkage
- Orthogonal implementations
- Minimize dependencies



Issues

- Concepts
- Philosophy
- Data representations

Examples: Concepts and Philosophies

- FORTRAN/COBOL Input/Output: Strictly synchronous
- Classic *IX I/O: synchronous, threads provide asynchronous capability
- RSX-11/OpenVMS: native asynchronous, synchronous is a combination with synchronization primitives

Examples: Data Formats/Representations

- ASCII/EBCDIC v UNICODE
- 2D v 3D
- Interesting example: Y2K

Limits on approximations

- Example: Earth's curvature
  - homes
  - Verrazano-Narrows Bridge
  - artillery

Management reasons for

- uncertainty
- change over time
- clarifications
- reduce risk – short and long-term

Summary

- long term vision is not costly
- foresight is priceless
- profitability is increased
- Architects are the stakeholders for the future

Questions?

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Session Notes & Materials:
http://www.rlgsc.com/iasa/nyc/2009/forethought-unspoken-foundation.html