Evolutionary Architecture

THE WHYS AND HOWS

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WHY SHOULD I CARE?
We’re good at requirements change.
What about ecosystem change?
How is long term planning possible under constant change?
How do we maintain this dynamic equilibrium?
How do we know we’re maintaining our “ilities” over time?
WHAT IS EVOLUTIONARY ARCHITECTURE?
An evolutionary architecture supports guided incremental change across multiple dimensions.
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An evolutionary computing fitness function characterizes how close a solution is to the desired result
An architectural fitness function characterizes how close a system is to the desired architectural characteristics.
TYPES OF FITNESS FUNCTIONS

- Atomic vs holistic
- Static vs dynamic
- Triggered vs continuous
- Manual vs automated
- Temporal
- Domain-specific?
EXAMPLE FITNESS FUNCTIONS

- Cyclic dependencies
- Consumer driven contracts
- Caching with staleness
- Monitoring
- Synthetic transactions
- Chaos Monkey
An evolutionary architecture supports guided incremental change across multiple dimensions.
Two aspects of incremental change - application and operations
Application functionality
Incremental from an operations perspective
An evolutionary architecture supports guided incremental change across multiple dimensions.
-ilities

accessibility  reliability  repeatability
accountability  extensibility  reproducibility
accuracy  failure transparency  resilience
adaptability  fault-tolerance  responsiveness
administrability  fidelity  reusability
affordability  flexibility  robustness
agility  inspectability  safety
auditability  installability  scalability
autonomy  integrity  seamlessness
availability  interchangeability  self-sustainability
compatibility  interoperability  serviceability
composability  learnability  supportability
configurability  maintainability  securability
correctness  manageability  simplicity
credibility  mobility  stability
customizability  modifiability  standards compliance
debugability  modularity  survivability
degradability  operability  sustainability
determinability  orthogonality  tailorability
demonstrability  portability  testability
dependability  precision  timeliness
deployability  predictability  traceability
discoverability  process capabilities  transparency
distributability  producibility  ubiquity
durability  provability  understandability
effectiveness  recoverability  upgradability
efficiency  relevance  usability
PRINCIPLES
PRINCIPLES OF EVOLUTIONARY ARCHITECTURE

- Last responsible moment
- Architect and develop for evolvability
- Postels Law
- Architect for testability
- Conway’s Law
Last responsible moment
Architect and develop for evolvability
Postel’s Law
Architect for testability
Conway’s Law
TECHNIQUES OF EVOLUTIONARY ARCHITECTURE

- Database refactoring
- Choreography
- Contract testing
Evolvability of different software architectures
Big ball of mud
Structured monolith
Layered monolith
Micro-kernel
Microservices
MECHANICS
Define your architectural fitness function
MECHANICS

- Define your architectural fitness function
- Select a dimension you’re most worried about
MECHANICS

- Define your architectural fitness function
- Select a dimension you’re most worried about
- Start improving on that dimension
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Select a dimension you’re most worried about
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Focus on what matters most
MECHANICS

- Define your architectural fitness function
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- Focus on what matters most
- Monitor trends, adapt and repeat
THANK YOU

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