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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?


ATCHES of SWITZERLAND
WATCHES of SWITZERLAND
O2

How do we know we're maintaining our "ilities" over time?

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

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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

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TECHNIQUES

TECHNIQUES OF EVOLUTIONARY ARCHITECTURE

- Database refactoring
- Choreography
- Contract testing

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EVOLVABILITY OF DIFFERENT SOFTWARE ARCHITECTURES

Big ball of mud

Structured monolith

Layered monolith

Micro-kernel

Microservices

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MECHANICS

- Define your architectural fitness function

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- Select a dimension you're most worried about

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- Start improving on that dimension

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- Focus on what matters most

MECHANICS

- Define your architectural fitness function
- Select a dimension you’re most worried about
- Start improving on that dimension
- Focus on what matters most
- Monitor trends, adapt and repeat

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THANK YOU

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