Building Evolutionary Architectures: Principles and Practices

Rebecca Parsons
Chief technology officer

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We're actually pretty good at requirements change but...

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What about ecosystem change?

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How is long-term planning possible under constant change?

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What is evolutionary architecture?

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An evolutionary architecture supports guided incremental change across multiple dimensions

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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

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An architectural fitness function characterizes how close a system is to the desired architectural characteristics

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Fitness functions aren't a new idea for technology but a unifying name

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Example fitness functions

- Cyclic dependencies
- Consumer driven contracts
- Caching with staleness
- Monitoring
- Synthetic transactions
- Chaos monkey

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Two aspects of incremental change - application and operations

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An evolutionary architecture supports guided incremental change across multiple dimensions

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-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
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standards
compliance
survivability
sustainability
tailorability
testability
timeliness
traceability
transparency
ubiquity
understandability
upgradability
usability

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agility
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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
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supportability
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testability
timeliness
traceability
transparency
ubiquity
understandability
upgradability
usability

evolvability

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Principles

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Last responsible moment

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Architect and develop for evolvability

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Postel's Law

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Architect for testability

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Conway's Law

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Techniques

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Database refactoring

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Choreography

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Contract testing

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Continuous delivery

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Evolvability and Experimentation

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Platform for Experimentation

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Culture of Experimentation

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Evolvability of different software architectures

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Big ball of mud

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Microservices

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Structured monolith

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Layered monolith

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Micro-kernel

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Governance

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Fitness function driven

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Outcomes not implementations

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Mechanics

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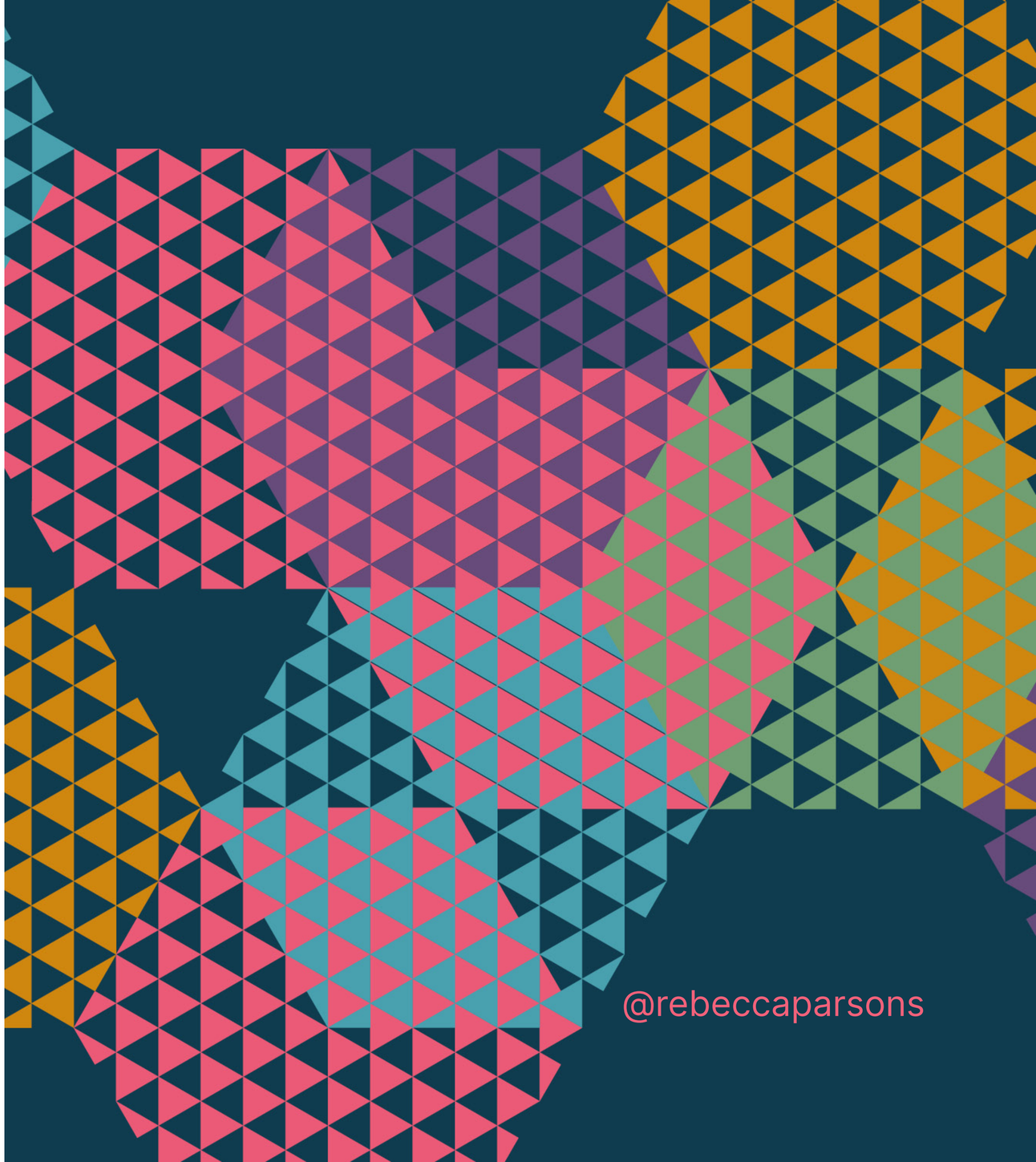
Mechanics

- 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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You need to evolve your fitness functions too

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Thank you

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