Architecting for the Cloud

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Cloud Architecture Principles

"Everything fails, all the time."

Werner Vogels, CTO, Amazon.com

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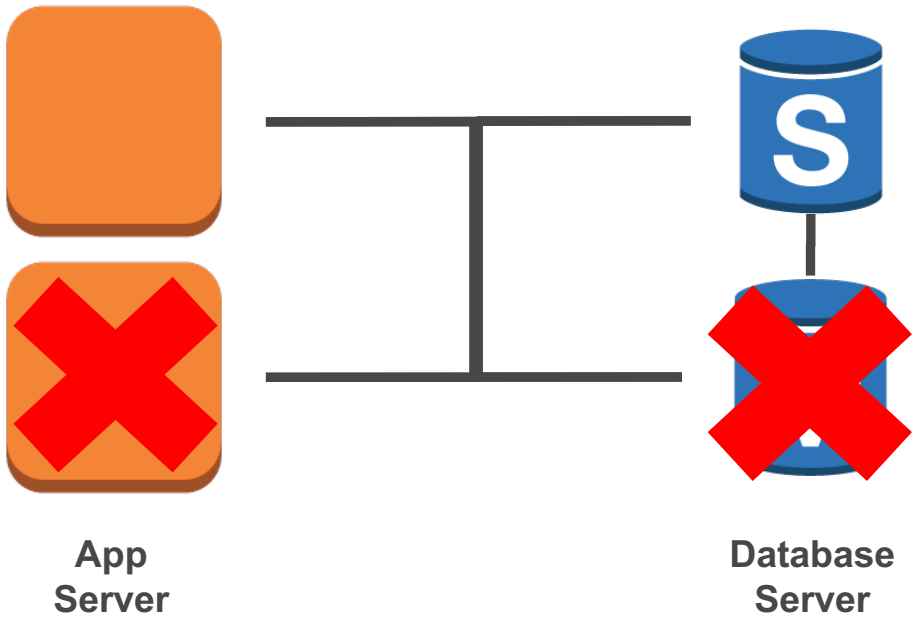
Cloud Architecture Principles

1. Design for failure and nothing will fail



Goal: Applications should continue to function even if the underlying application component fails, communication is lost or physical hardware fails, is removed/replaced.

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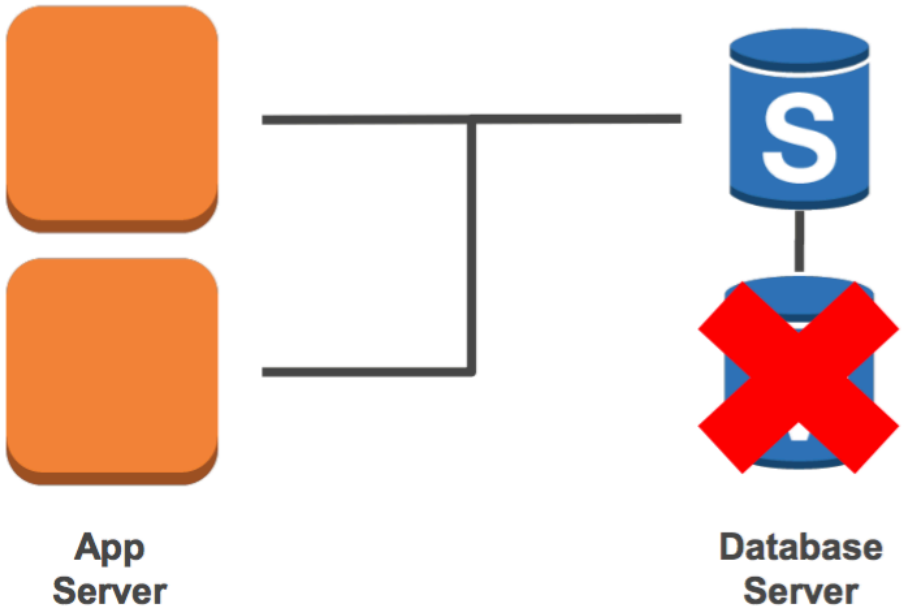

- Have a coherent backup and restore strategy for your data
- Build process that resume on reboot
- Keep pre-configured and pre-optimized virtual images to support the above on launch/boot
- Allow the state of the system to re-sync by reloading messages from queues
- Avoid in-memory sessions or stateful user context, move that to data stores

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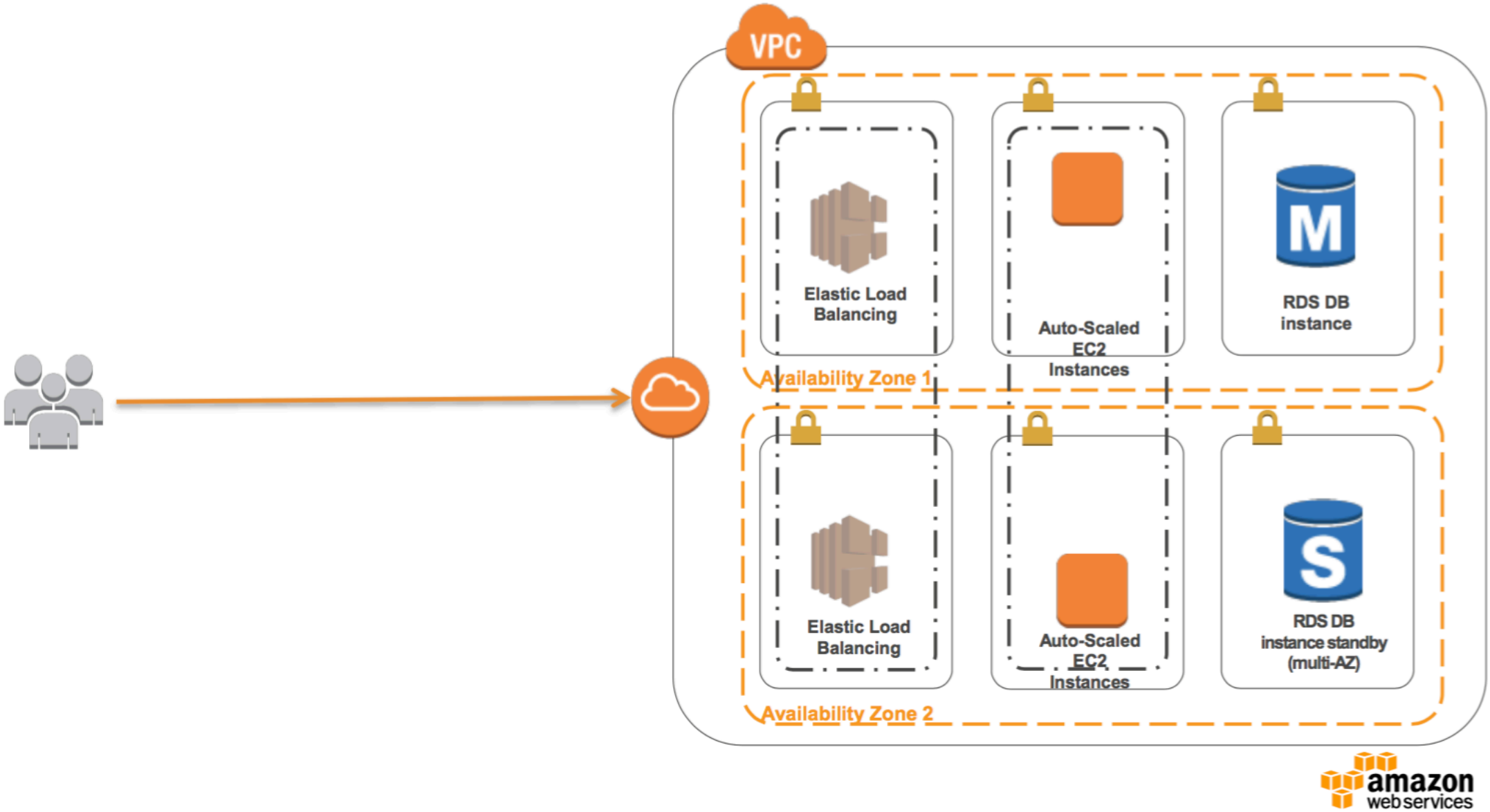
VPC
Elastic Load Balancing
Auto-Scaled EC2 Instances
RDS DB instance
Availability Zone 1
Elastic Load Balancing
Auto-Scaled EC2 Instances
RDS DB instance standby (multi-AZ)
Availability Zone 2
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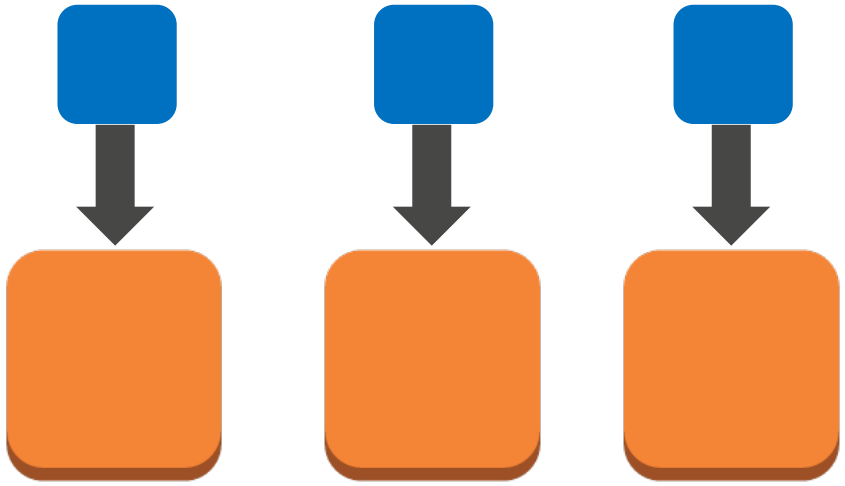
Cloud Architecture Principles

2. Embrace Elasticity & Automate



- Do not assume health, availability or fixed location of components (e.g. fixed IP)
- Automate installation and configuration of environment
- Favor dynamic configuration

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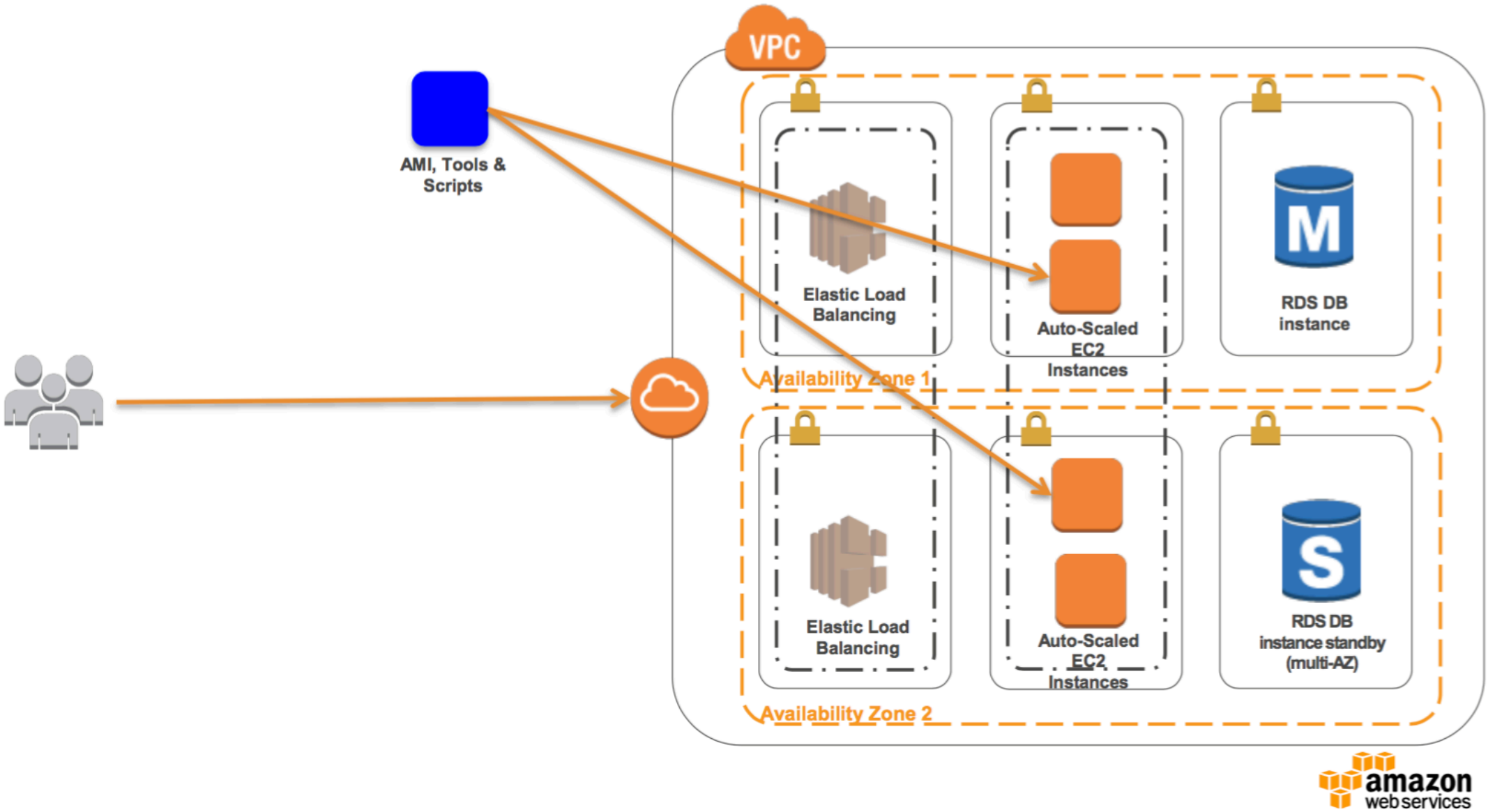
VPC
AMI, Tools &
Scripts
Elastic Load
Balancing
Auto-Scaled
EC2
Instances
RDS DB
instance
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Cloud Architecture Principles

3. Loose coupling sets you free

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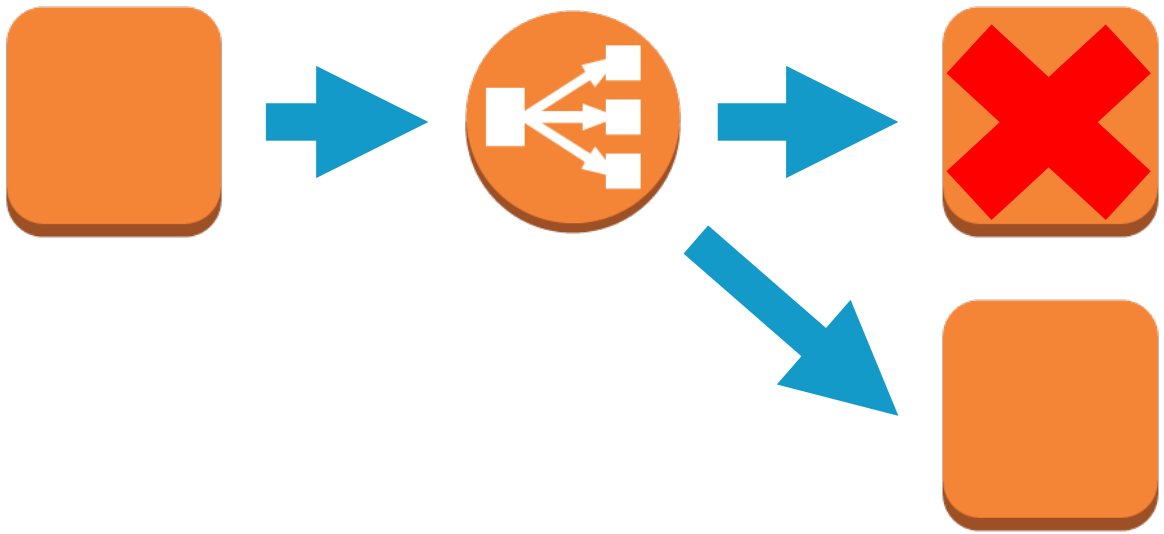

- Design architectures with independent components
- Design every component as a black box
- Load balance clusters

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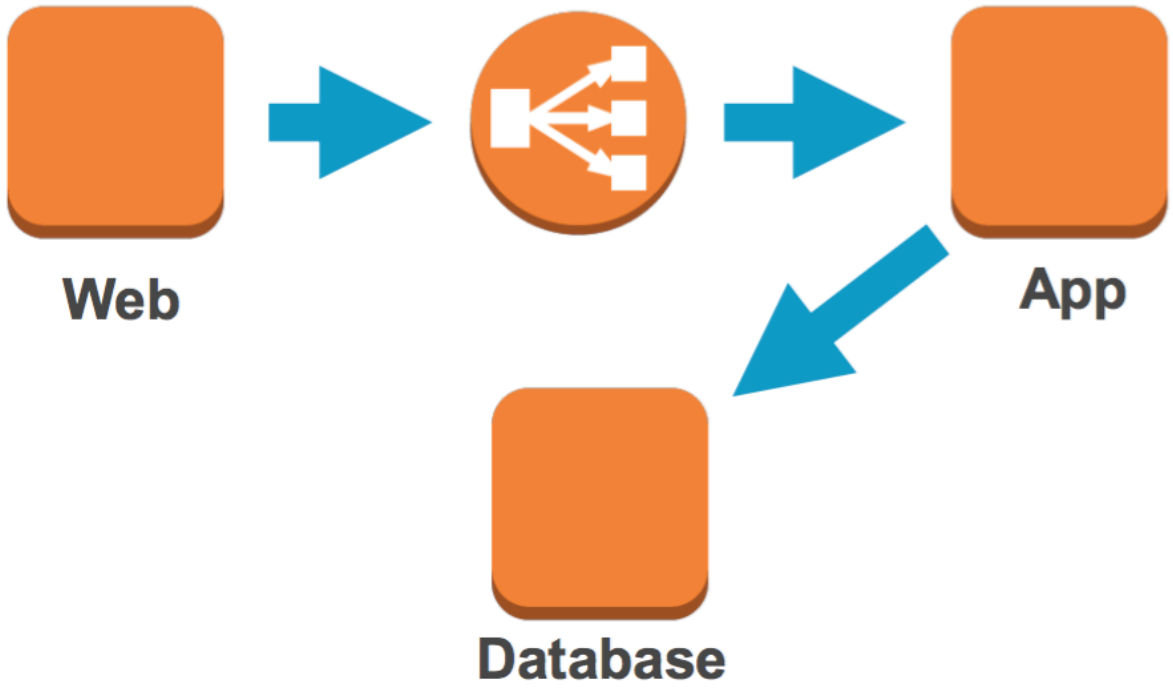
Cloud Architecture Principles

3. Loose coupling sets you free



- Separate application into independent tiers

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Cloud Architecture Principles

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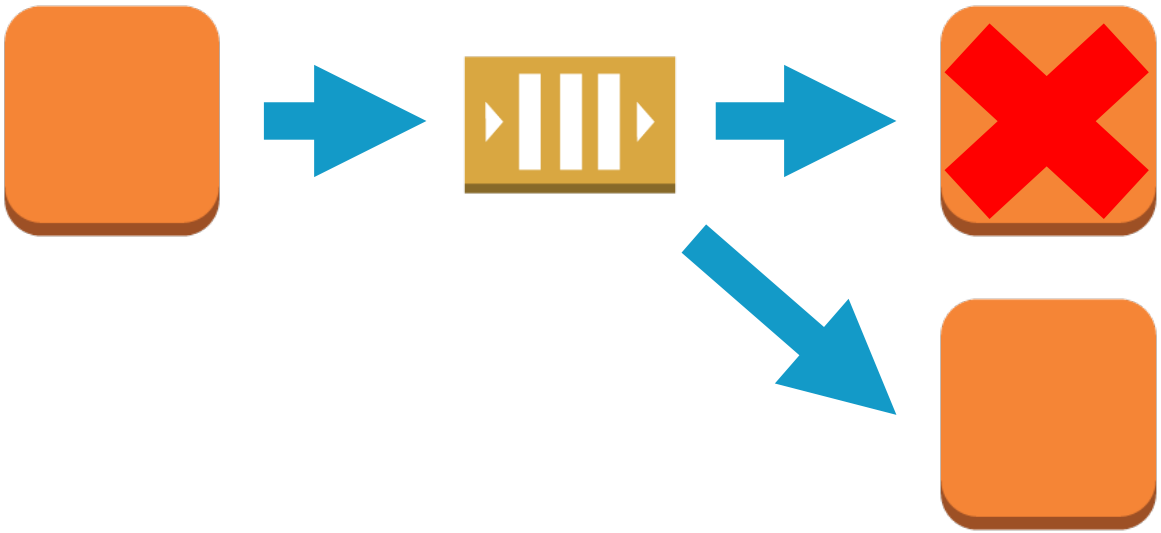
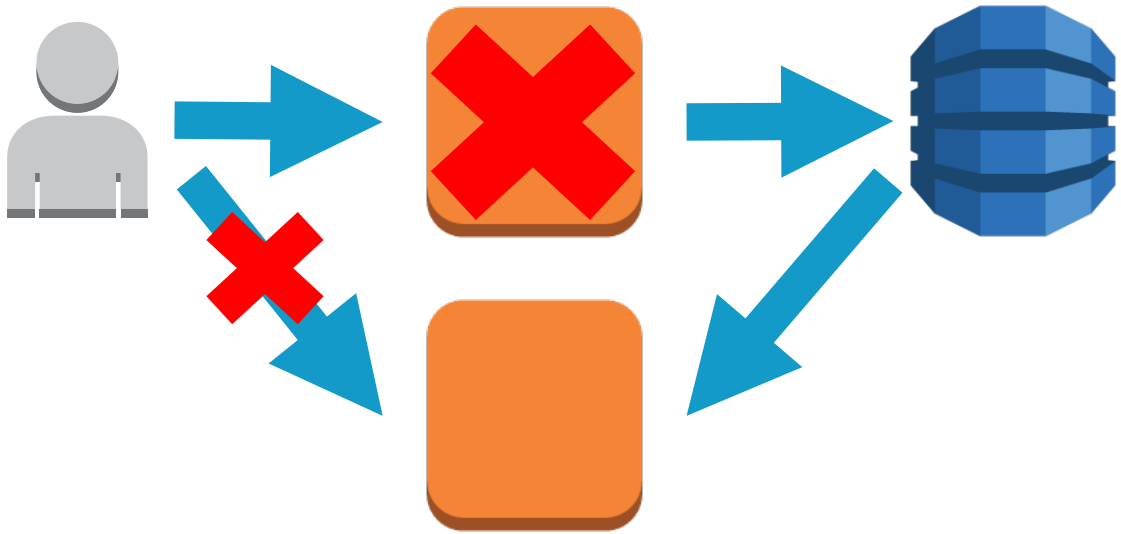


- Use queues to pass messages between components

Cloud Architecture Principles

4. Become Stateless



- Don’t store state in server
- Leverage services to hold state information
- Application functions regardless of which application node processes the request

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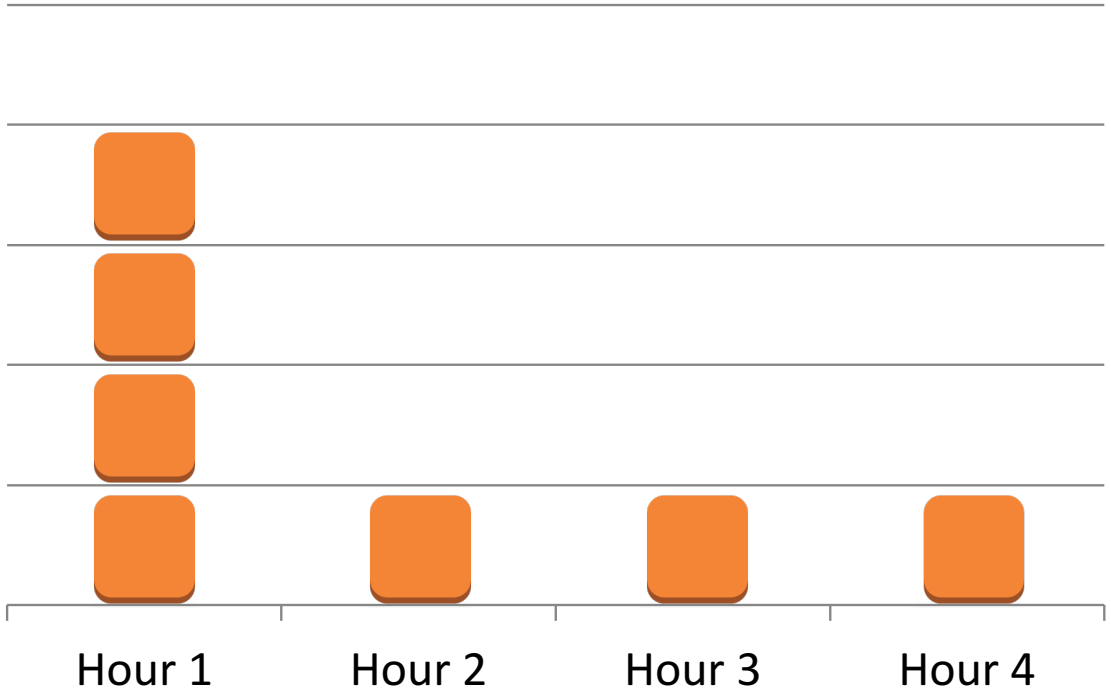
Cloud Architecture Principles

5. Think Parallel



- One Server working for Four hours costs the same as Four servers working for One hour
- Combine with elasticity to increase capacity when you need it most

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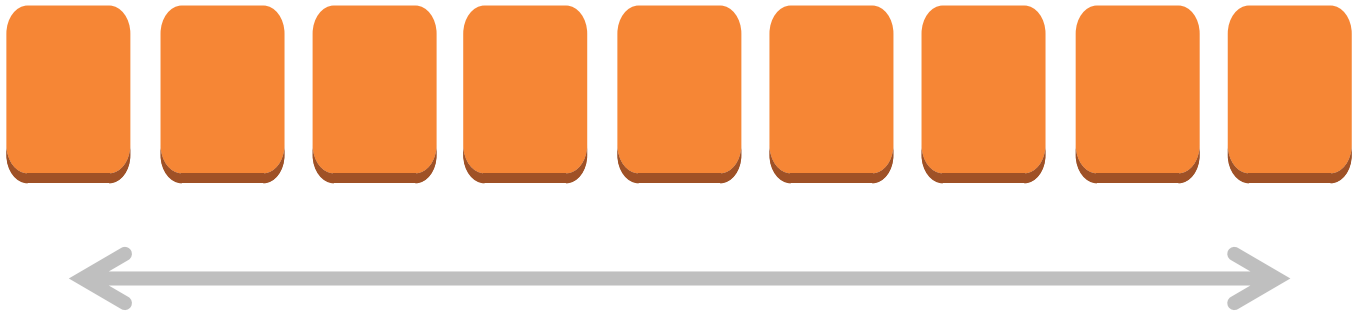
Having done that…

Having decomposed into
small, loosely coupled,
stateless building blocks



You can now Scale out with ease

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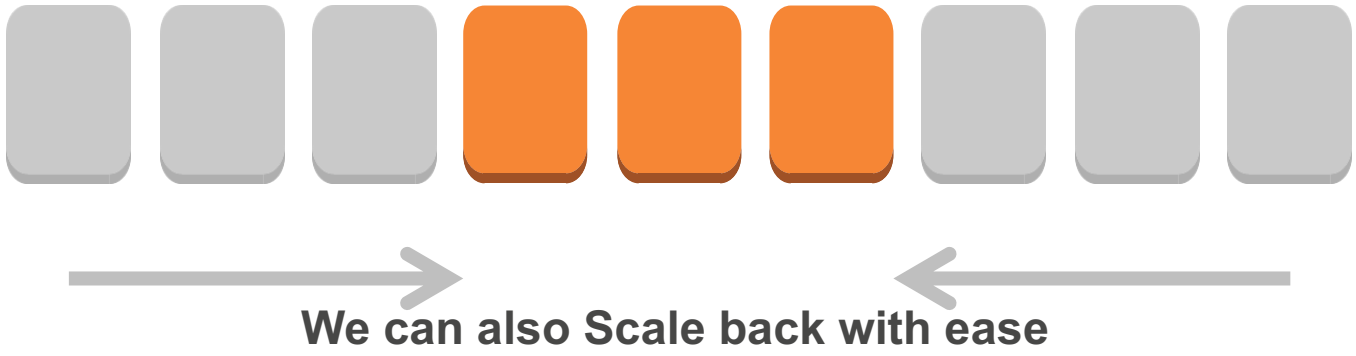
Having done that…

Having decomposed into small, loosely coupled, stateless building blocks



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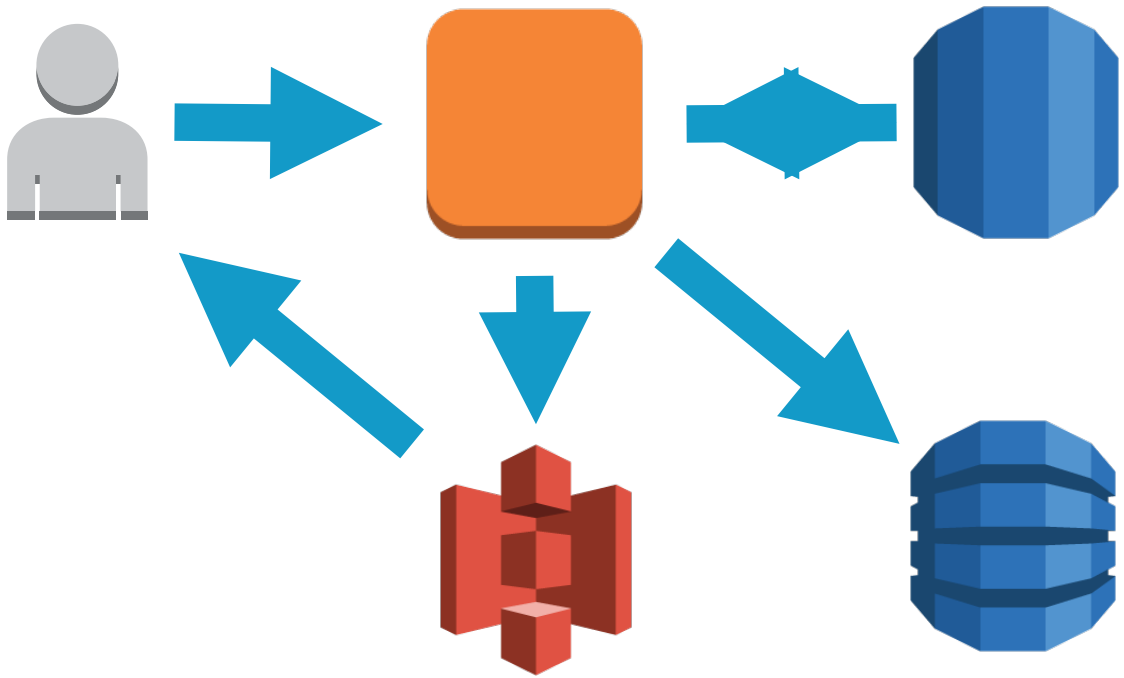
Cloud Architecture Principles

6. Leverage different storage options



- Don’t log clicks to RDBMS, use NoSQL data store
- Don’t store images in RDBMS, use object store
- Offload log files to scalable object storage

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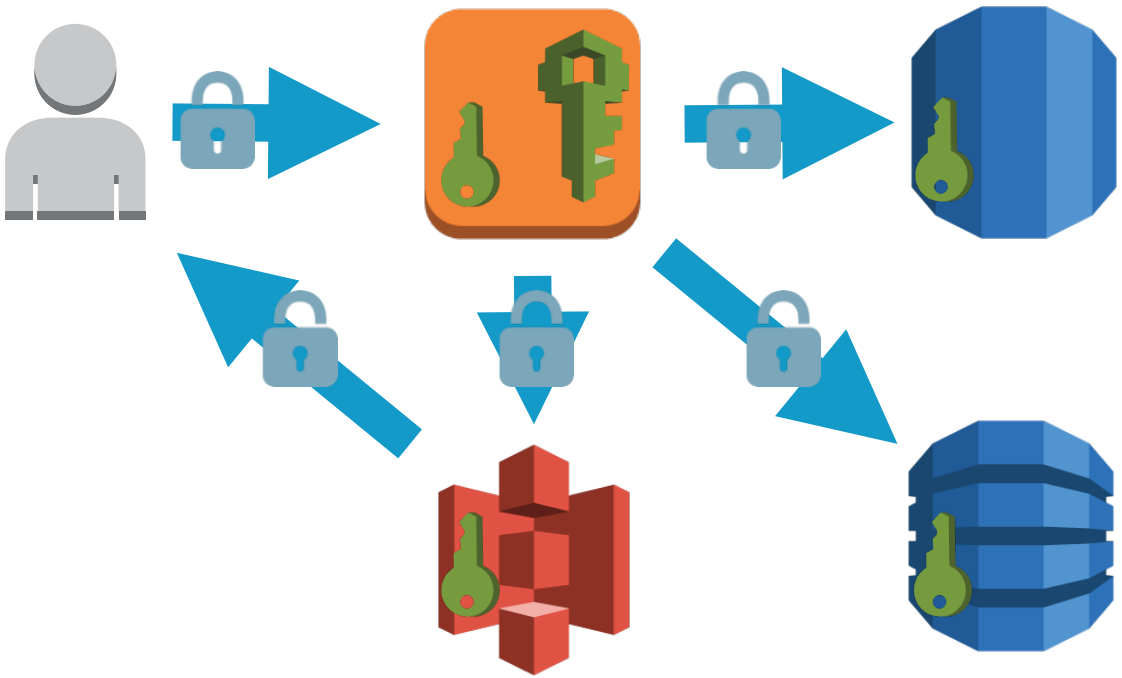
Cloud Architecture Principles

7. Build Security into every layer



- Encrypt data in transit and rest between application tiers
- Enforce principle of least privilege across every service
- Automatically rotate security keys frequently

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4. Become Stateless
5. Think Parallel
6. Leverage different storage options
7. Build Security into every layer