Virtual Middleboxes as First-Class Entities in the Cloud

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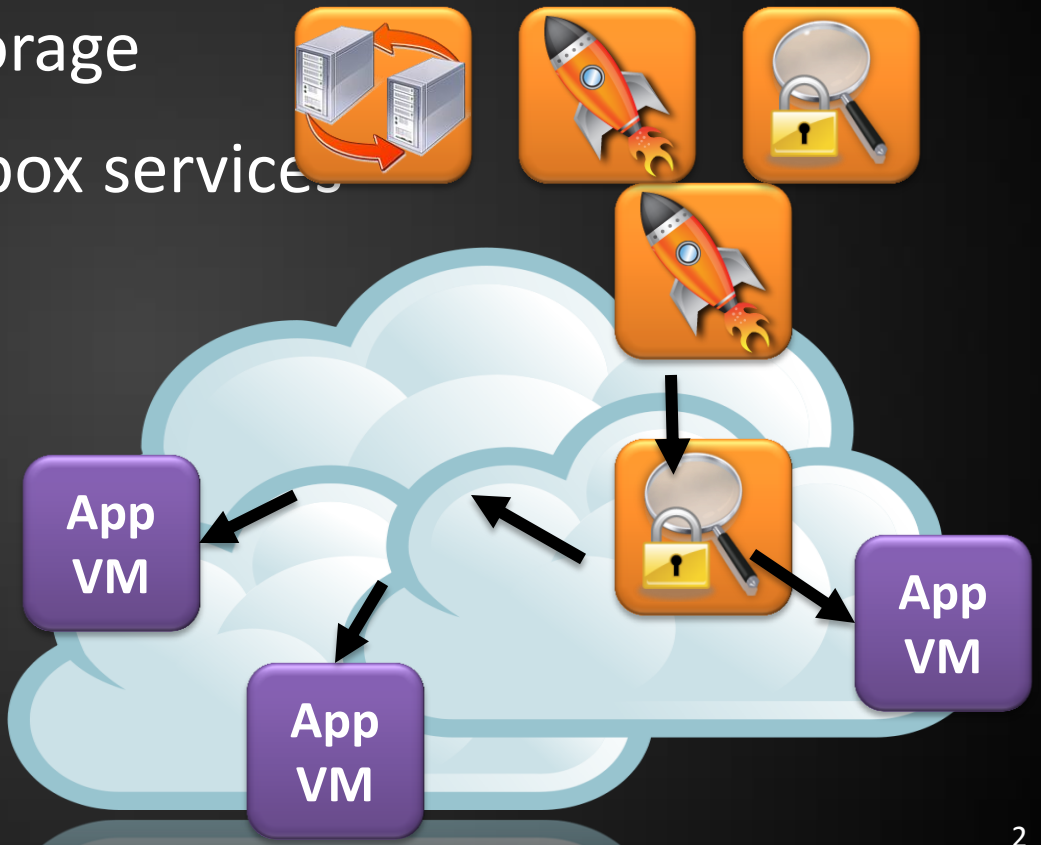
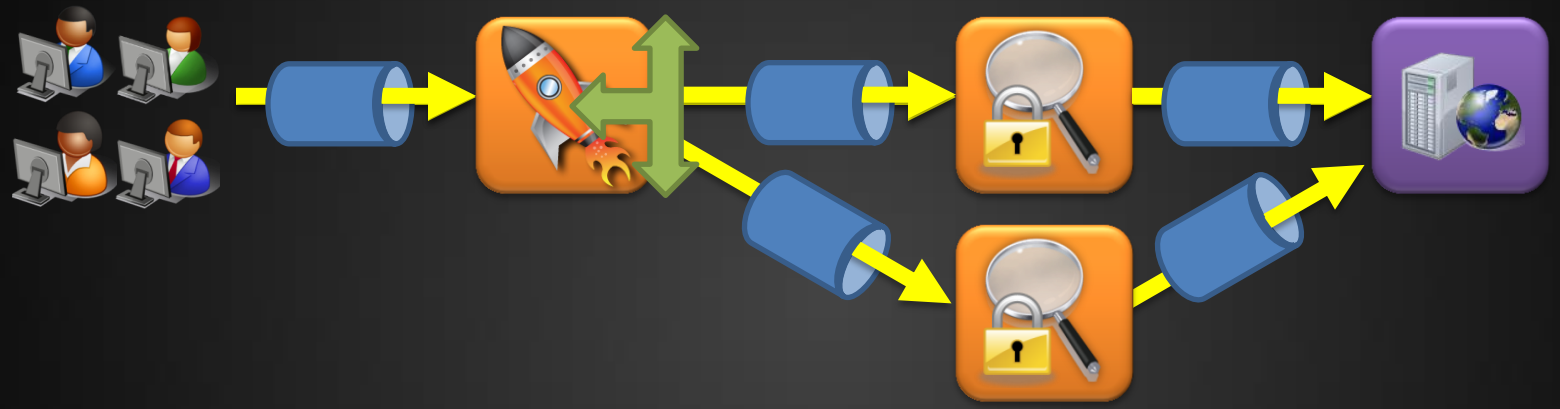
Deploying Middleboxes Today

- Elastic compute and storage
- Limited add-on middlebox services
- Middlebox vendors are providing VM images

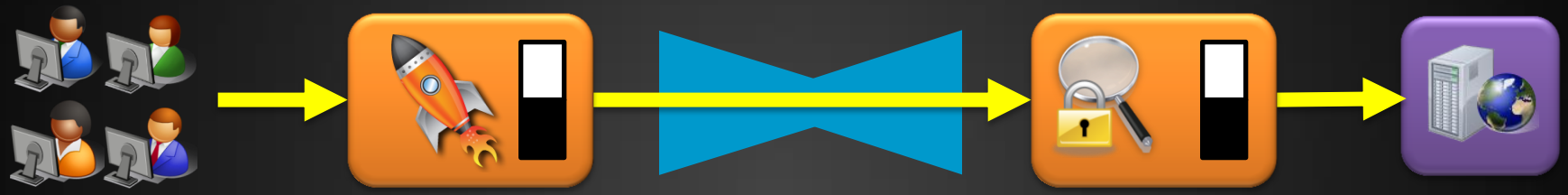


Challenge: Integration



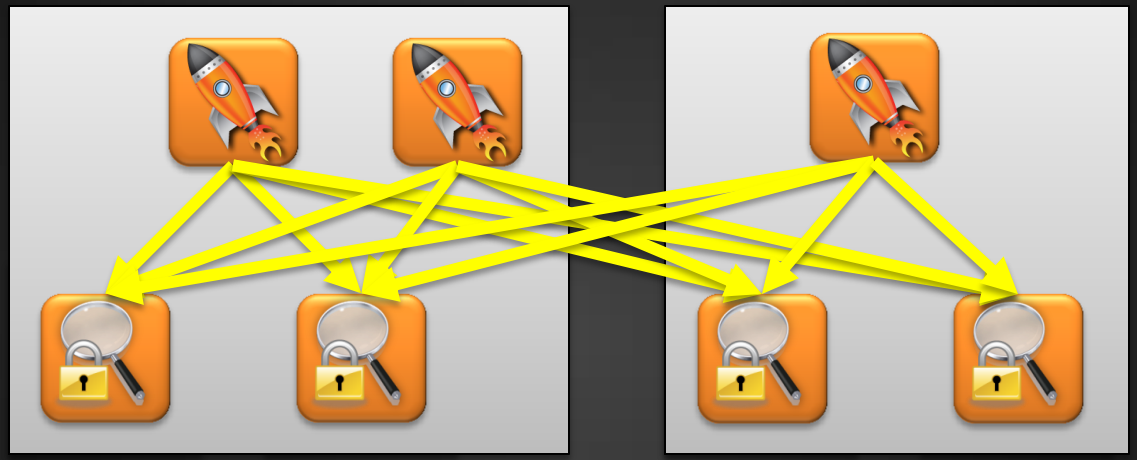
- Manually piece together tunnels and traffic splitters
  - **Brittle and inflexible**
- Goal: low complexity for tenants

Challenge: Performance



- Scale based on CPU/memory
  - **Network significantly impacts performance**
- Goal: high performance

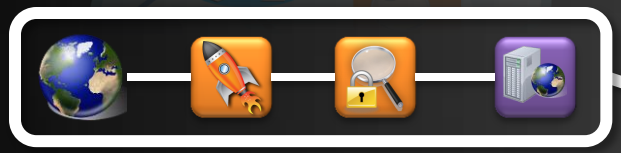
Challenge: Efficiency



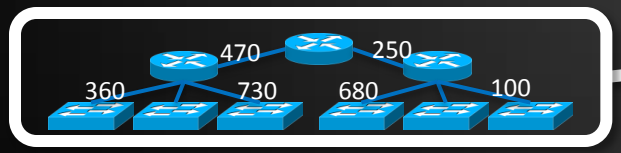
- Distributed placement & naïve flow distribution
  - Over-utilized network and under-utilized compute
- Goals: minimize costs; support more tenants

Stratos (a.k.a. CloudMB)

Network-aware *orchestration layer for middleboxes in clouds*



VM Manager



Software Switches

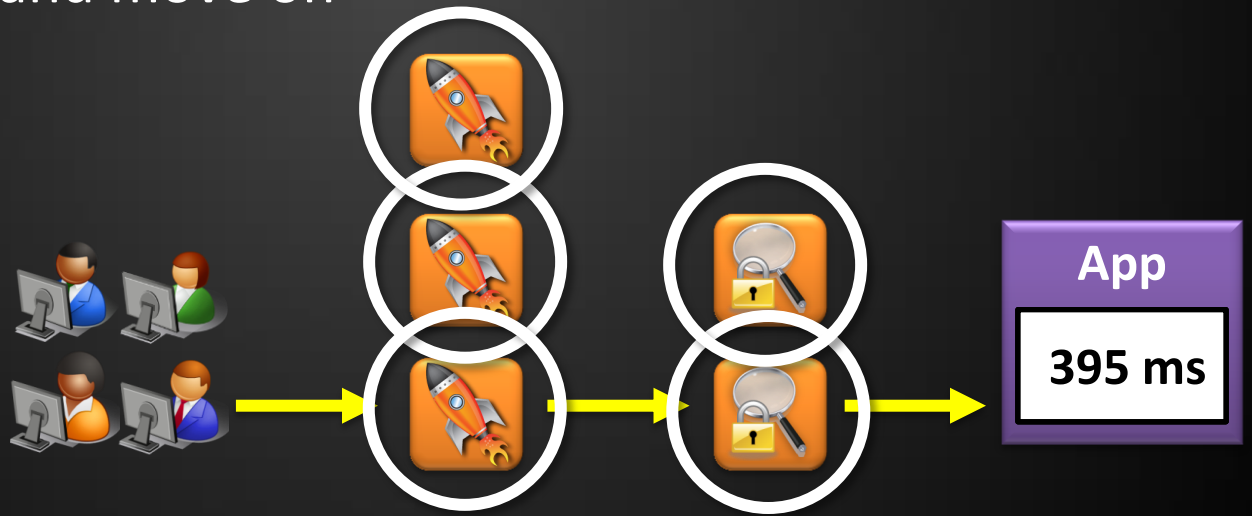
Scaling

Placement

Flow Distribution

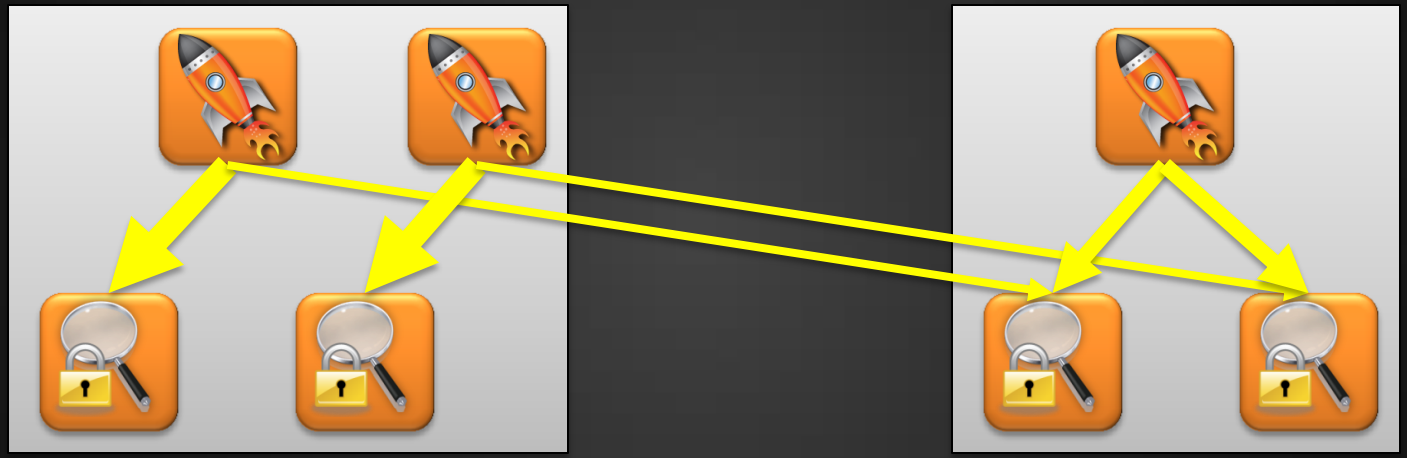
Stratos Scaling

- Based on application performance
- Scaling trials along a sequence
  - If ↓ Latency: Keep and try another
  - Else: Discard and move on



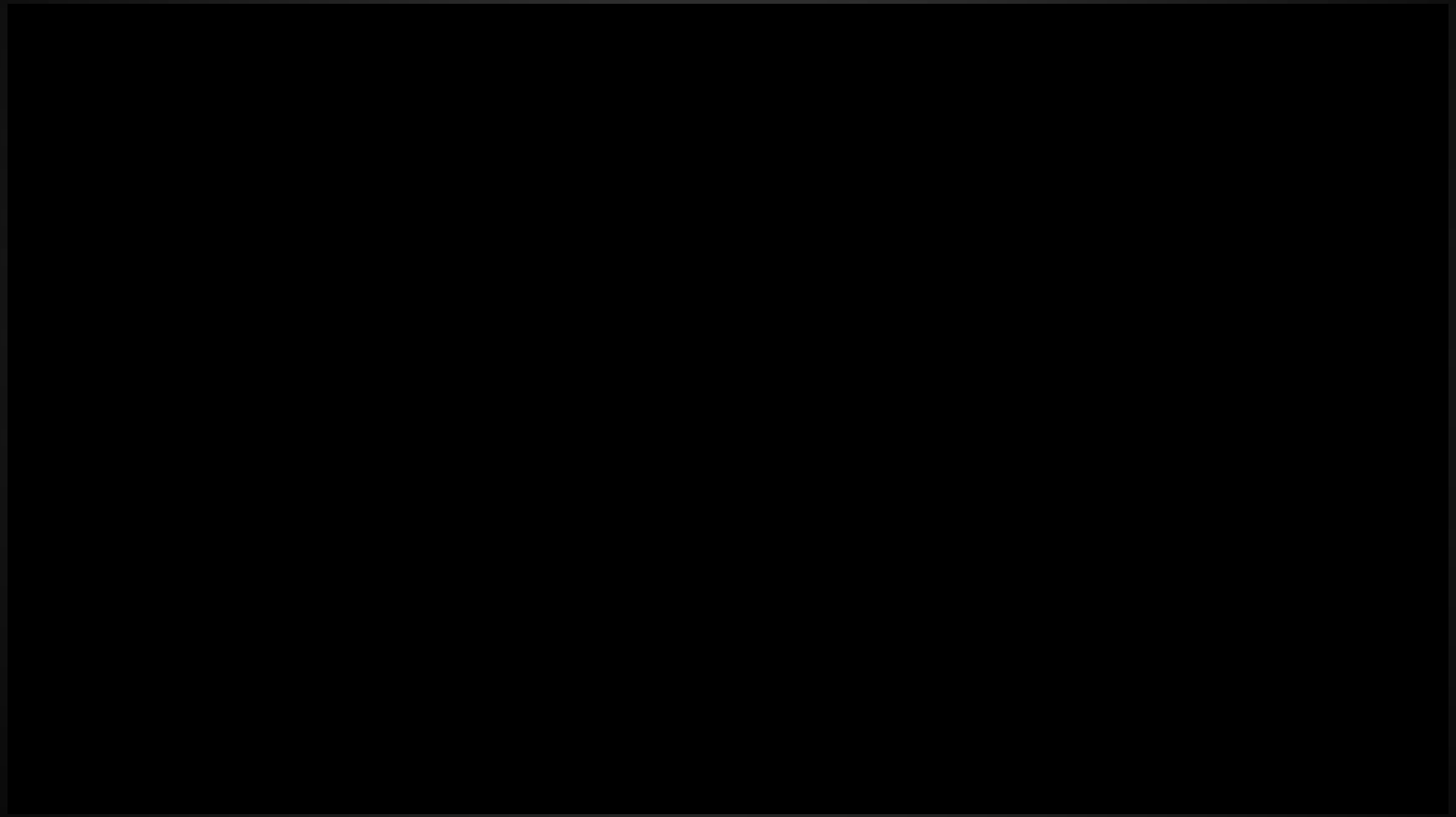
Stratos Flow Distribution

- Minimizes inter-rack traffic using linear program



- Triggered following scaling, and periodically

Demonstration



Stratos Summary

Network-aware orchestration layer for middleboxes in clouds

- Deployable by cloud providers or third parties
- Minimizes network interactions
- Maximizes efficiency for tenants and providers

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