The SPEC Cloud Group's Research Vision on FaaS and Serverless Architectures

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SPEC RG Cloud - Serverless

Gaining deeper understanding in serverless and FaaS architectures, with a focus on performance (evaluation).

Business Logic vs. Operational Logic

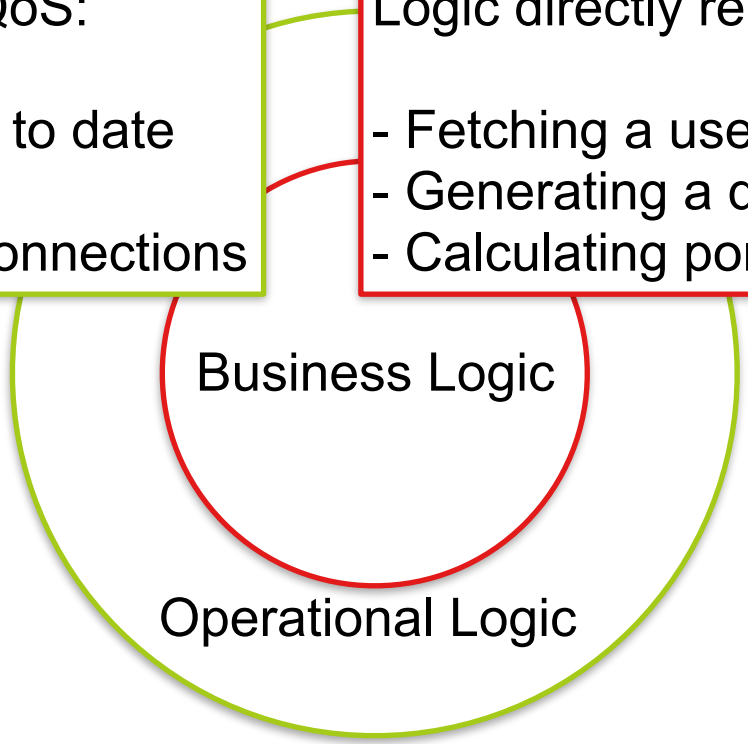
Business Logic vs. Operational Logic

Logic related to QoS:

- Keeping OS up to date
- Serving clients
- Managing DB connections

Logic directly related to use case:

- Fetching a user's balance
- Generating a daily report
- Calculating portfolio risk



Types of logic
FaaS
Serverless
Challenges

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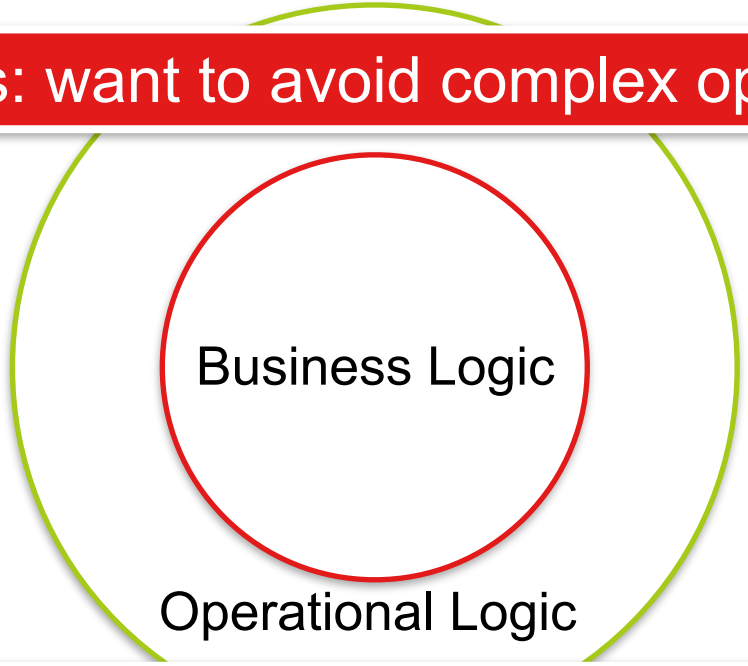
Joint Problem

Cloud users: want to avoid complex operational logic



Cloud providers: aim for higher resource utilization

Types of logic
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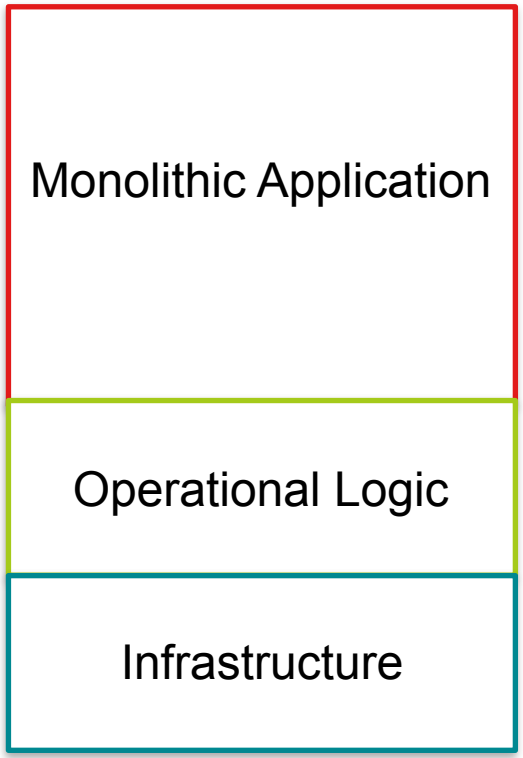
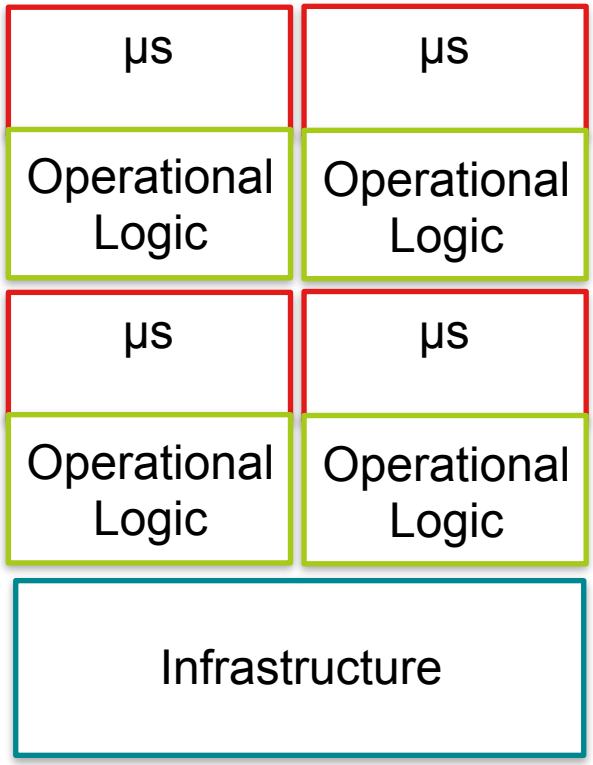
Monoliths

- Difficult to Scale
- Infrequent, complex deployments
- Tightly coupled stack



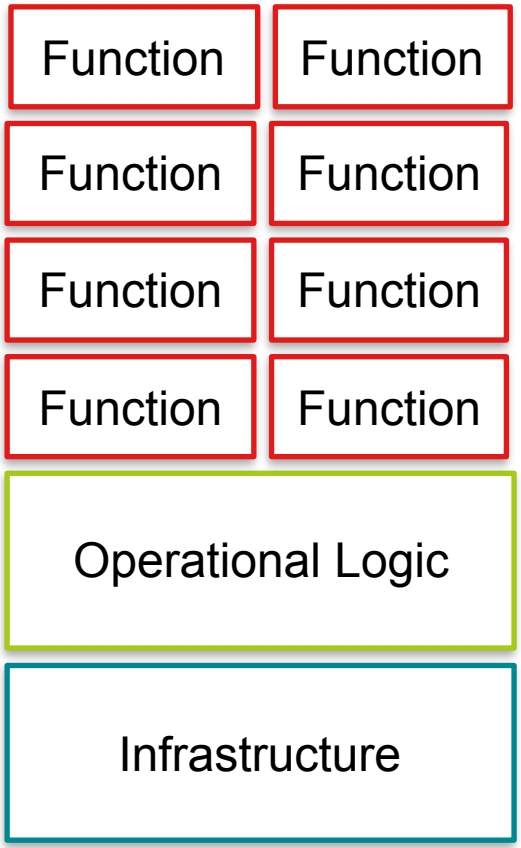
Microservices (µs)

- scalable
- DevOps practices
- Complexity shifts from application logic to operational logic.



Function-as-a-Service

- Clear separation of business logic vs. operational logic
- Minimal unit of deployment
- Minimal coupling between each layer



Types of logic
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Monoliths Microservices FaaS

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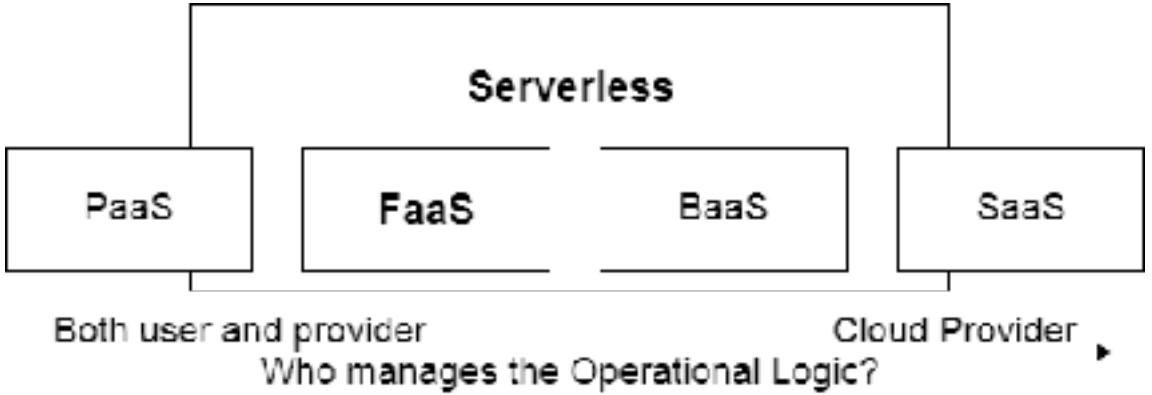
Serverless vs. FaaS



Types of logic
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Serverless

- (Almost) no operational logic
- Event-Driven
- Granular billing

FaaS

- A form of *serverless* computing
- User provides a function — deployed and managed by cloud provider

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What is next in Serverless?

Types of logic
FaaS
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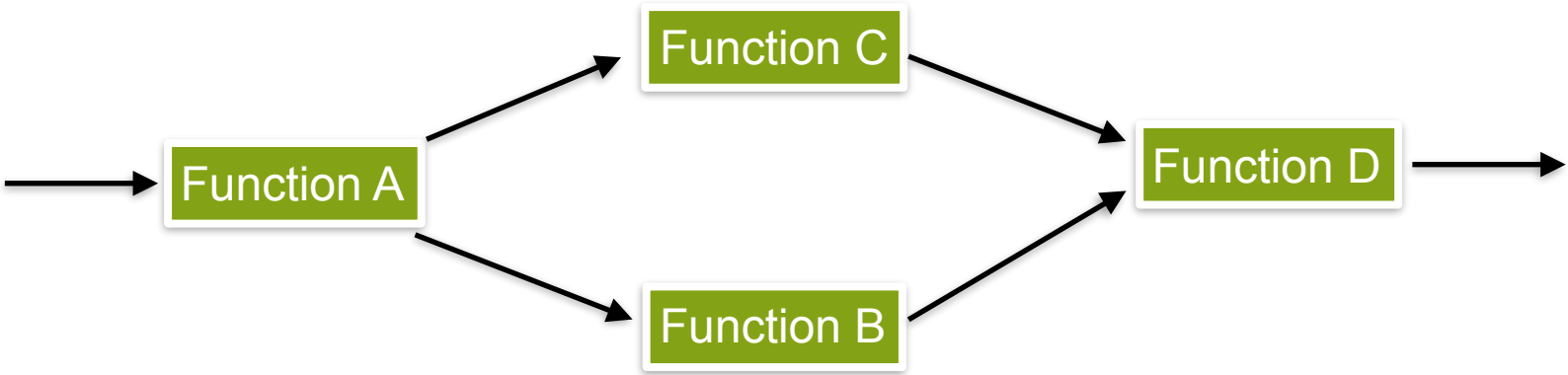
Further Separation of Business and Operational Logic

- Function Composition
  - Serverless workflows



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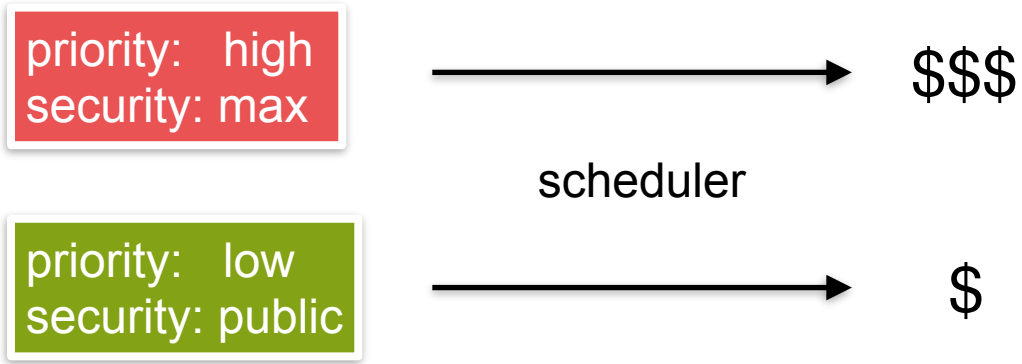
Focus on Cost/Performance

- Non-Functional Requirements (NFRs)



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Hybrid Clouds

- Benchmark of FaaS platforms
  - Reliability
  - Latency: cold/hot starts
  - Throughput
  - …

Roadmap

- Extended vision
- Reference Architecture
- Benchmark

HotCloudPerf'18

- "Performance in the cloud datacenter"
- April 9, 2018 in Berlin, Germany
- https://hotcloudperf.spec.org/
- Held in conjunction with ICPE 2018

Interested?

https://research.spec.org/working-groups/rg-cloud.html

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Additional Slides

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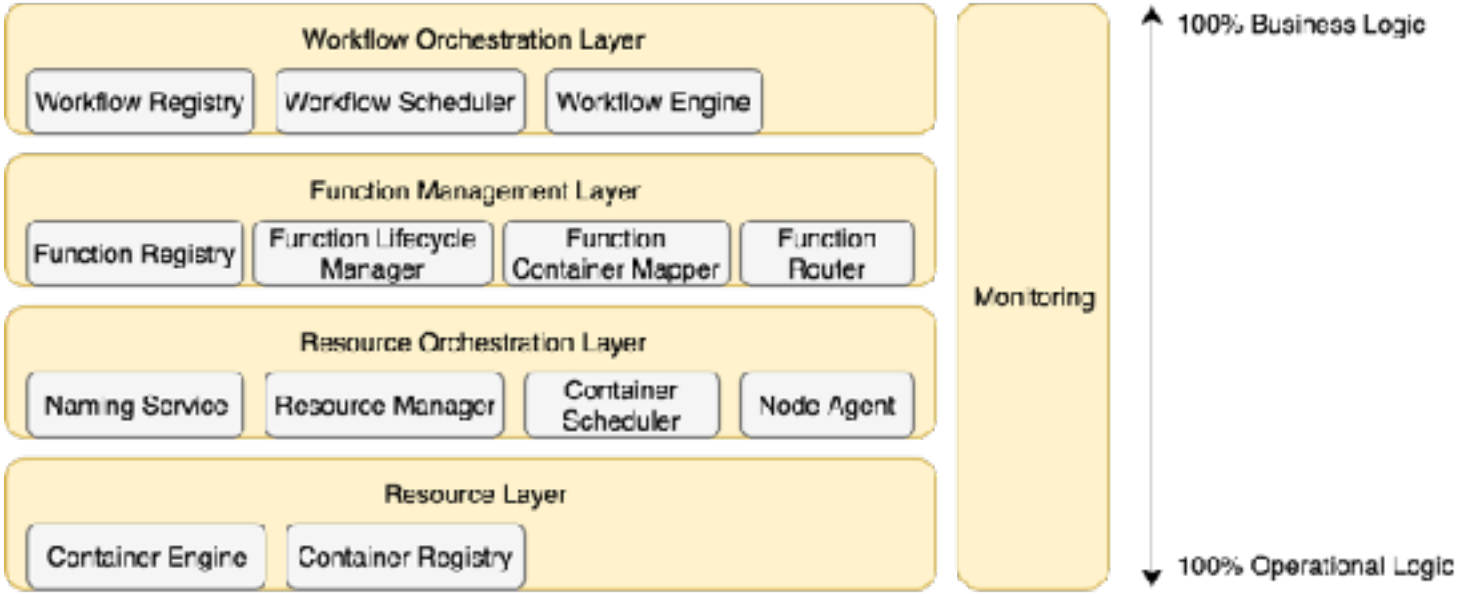
Ongoing work:
reference architecture for FaaS platforms



Why Research Serverless and FaaS?

- Growing industry-driven adoption.
- Current approaches are still very immature and wasteful.
- Far more logic delegation to the infrastructure (us!).
- New technologies, same issues
  - orchestration, versioning, scheduling, testing, monitoring, benchmarking…