

A SPEC RG Cloud Group's Vision on the Performance Challenges of FaaS Cloud Architectures

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ICPE 2018

Function-as-a-Service has diverse, unexplored performance challenges that need your expertise!



SPEC RG CLOUD - Serverless/FaaS Activity

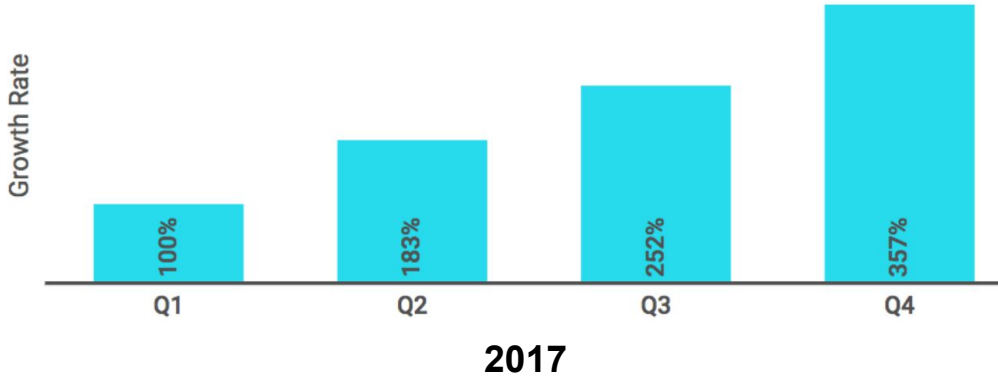
Exploring community-wide (performance) challenges in serverless and FaaS architectures.



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

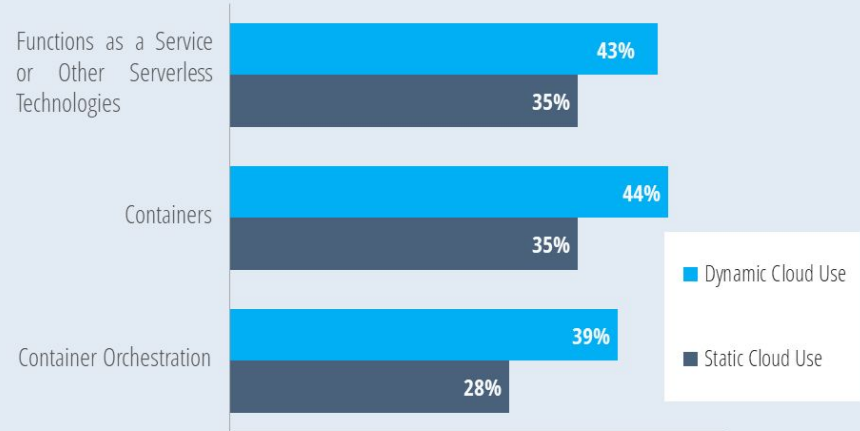
Function-as-a-Service Market estimated to be worth **\$7.72 Billion** by 2021

Adoption of FaaS (AWS Lambda)



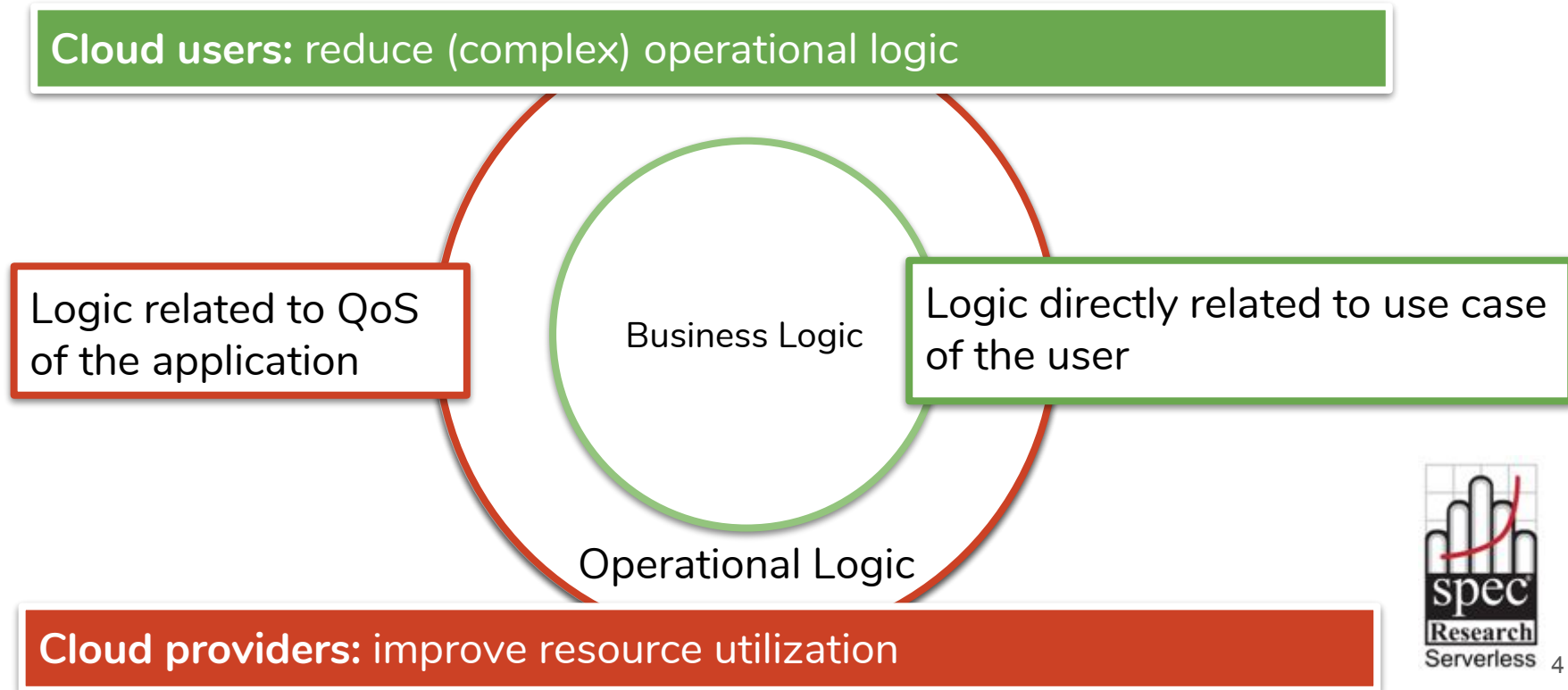
Gartner 2017 Function-as-a-Service is one of the top trends in cloud computing.

Serverless Matches Container Adoption

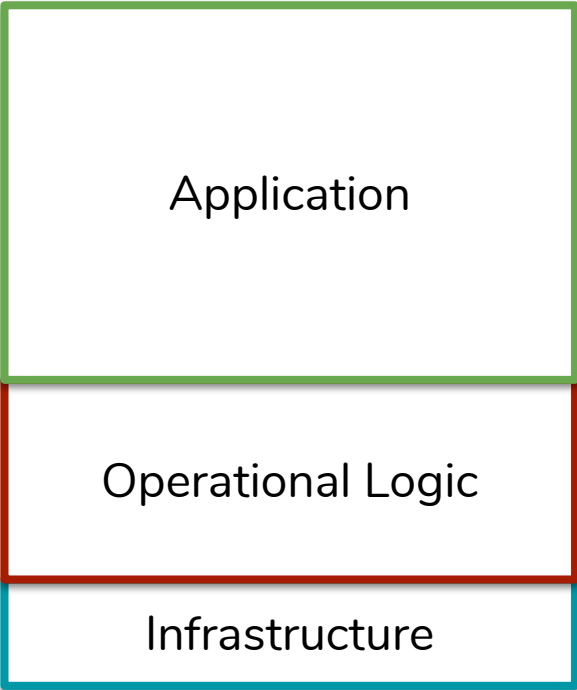


Source: The New Stack Analysis of a February 2017 survey of 500+ IT professionals (<https://newrelic.com/content/dam/newrelic/resources/ebooks/cloud-survey-report-ebook.pdf>). Static Cloud: Public cloud used to some extent but applications are managed like before. Dynamic Cloud: A significant portion of strategic workloads are run in the public cloud and the enterprise is able to agilely re-allocate resources.

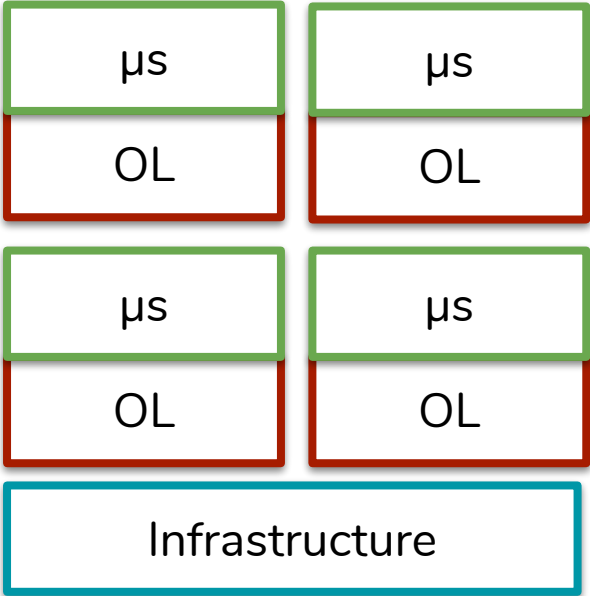
Joint Problem



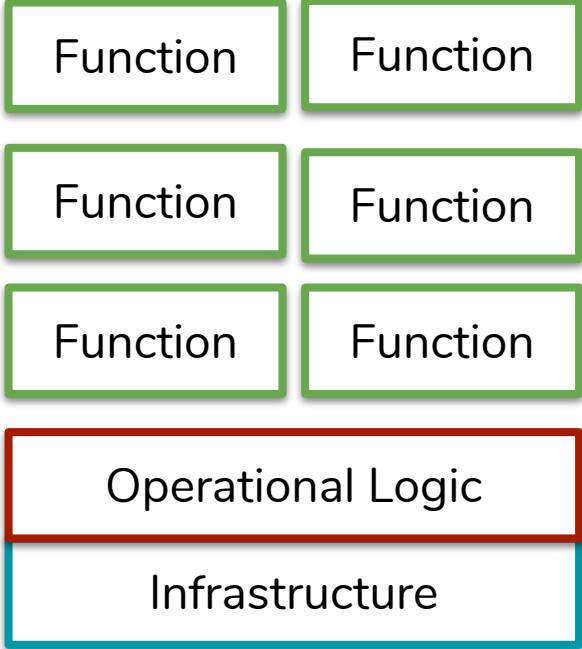
Evolution of cloud application architectures



Monoliths



(Micro)services



FaaS

Performance Challenges

1. Reducing FaaS overhead
2. Performance isolation
3. Scheduling policies
4. Performance prediction
5. **Engineering for cost-performance**
6. **Evaluating and comparing FaaS platforms**

For challenges in other domains:

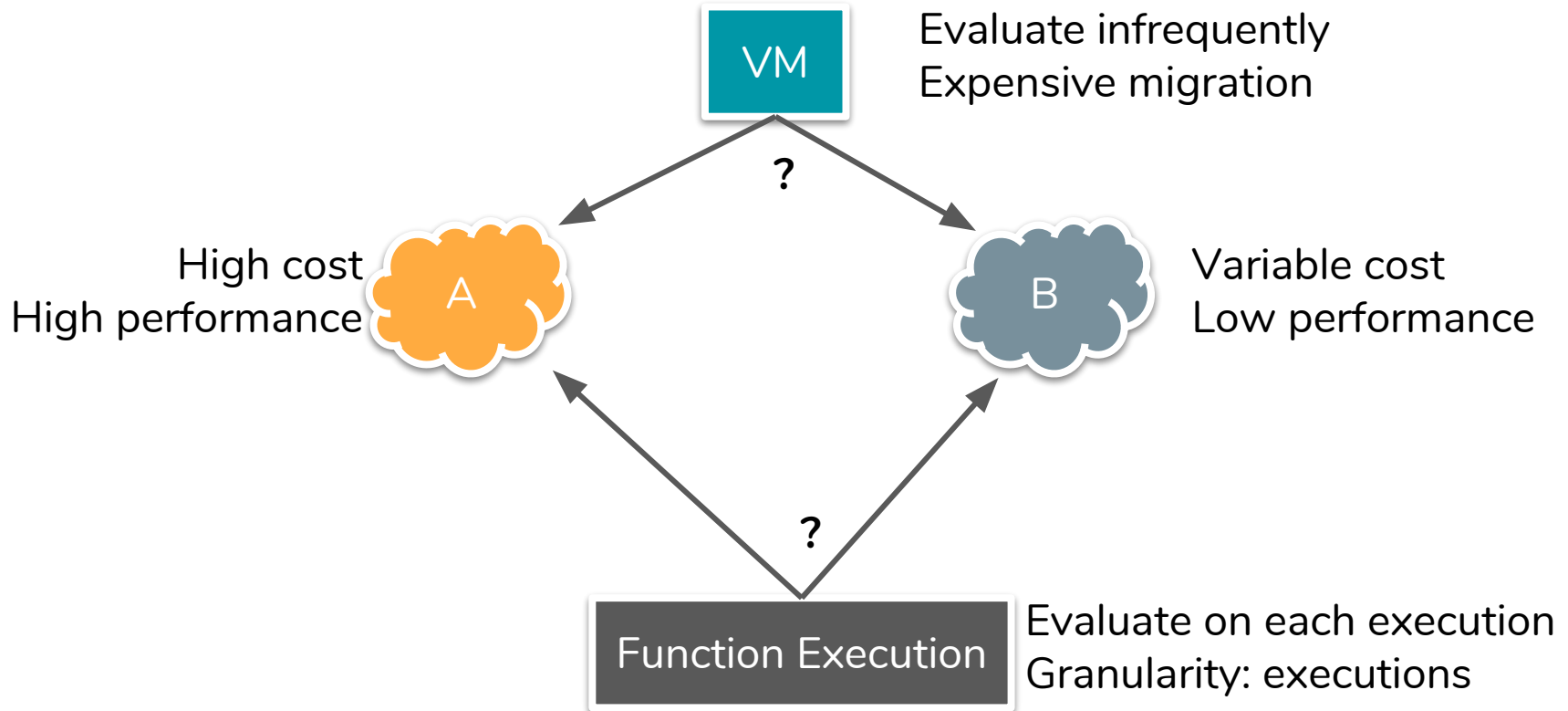
The SPEC Cloud Group's Research Vision on FaaS and Serverless Architectures

Erwin van Eyk, Alexandru Iosup, Simon Seif, Markus Thoemmes

WoSC@Middleware 2017

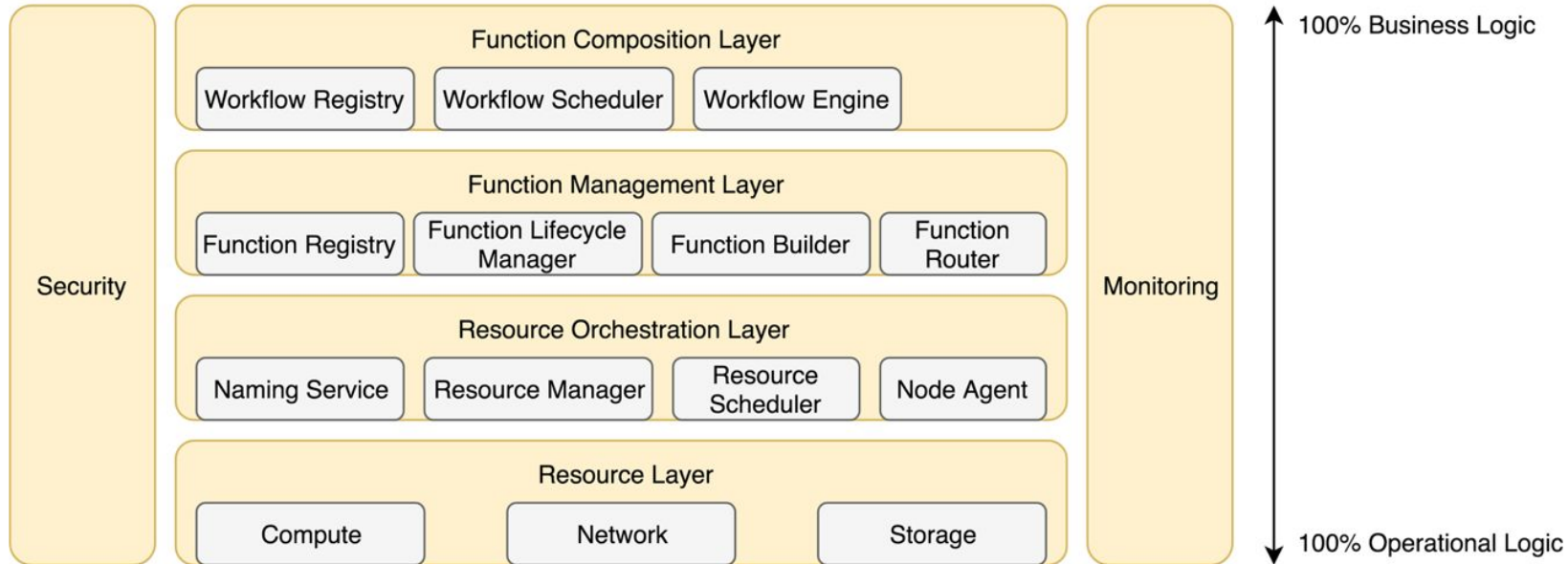


Challenge: engineering for cost-performance



Roadmap 2018

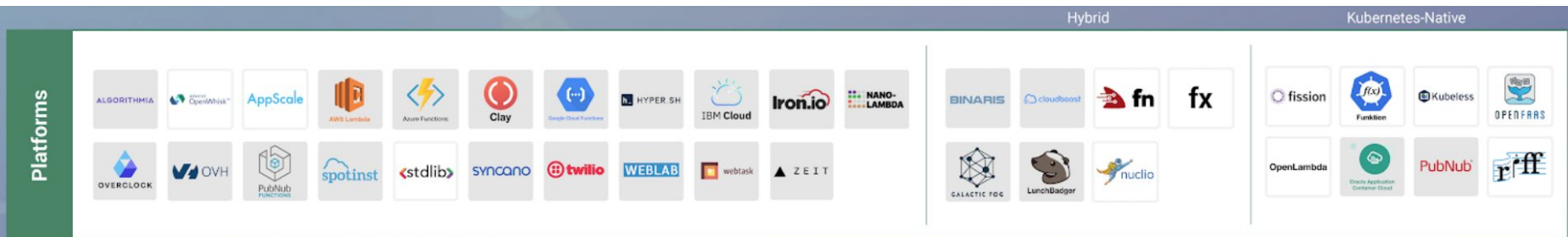
1. Reference Architecture of FaaS platforms
2. Benchmark of FaaS platforms



WiP Reference Architecture of FaaS platforms

Roadmap 2018

1. Reference Architecture of FaaS platforms
2. Benchmark of FaaS platforms



Take-away message

Function-as-a-Service has diverse, unexplored performance (evaluation) challenges that need your expertise!

Interested in serverless computing? Join us!



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



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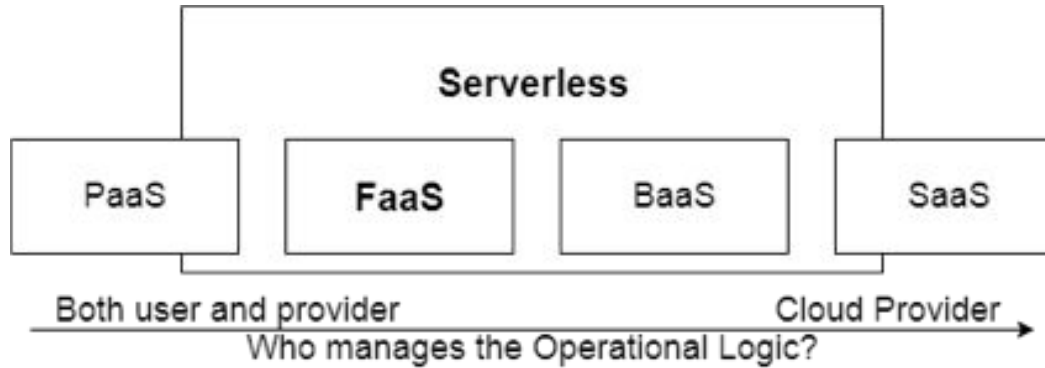
E.vaneyk@atlarge-research.com

We (SPEC RG CLOUD) are applying to host a **Dagstuhl Seminar** on *Reproducible and Efficient Performance Engineering for Next-Generation Clouds*. Industry and academia, 30 persons, invitation-only. Join us!



Additional Slides

Serverless and Function-as-a-Service



Serverless

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

FaaS

- A form of serverless computing
- User provides a function (source)
- Function deployed and managed by cloud provider

Libraries

python-λ

Tools



IO|pipe



Stackvana



Frameworks



BUSTLE



kappalO



serverless



Platforms



Hybrid



Kubernetes-Native



Security

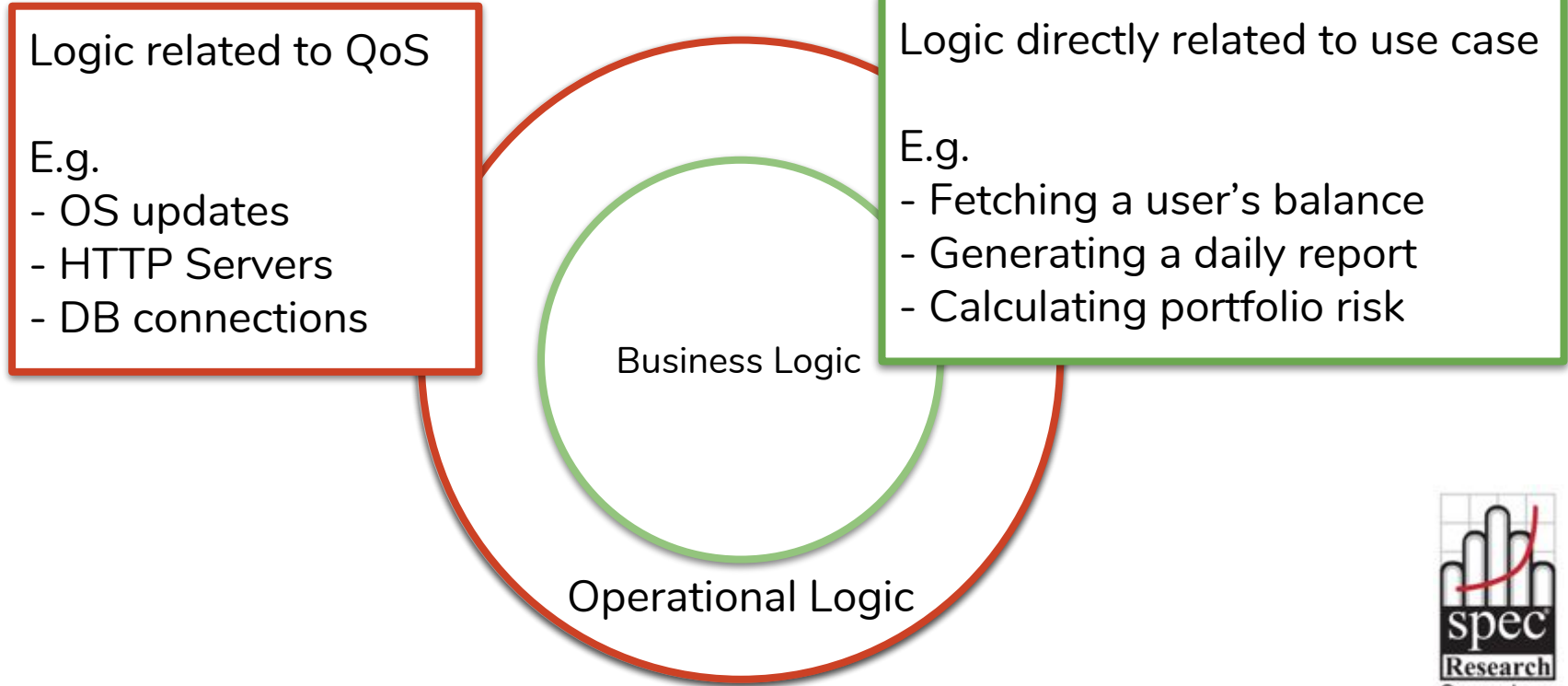


github.com/cncf/landscape

Serverless computing refers to a new model of cloud native computing, enabled by architectures that do not require server management to build and run applications. This landscape illustrates a finer-grained deployment model where applications, bundled as one or more functions, are uploaded to a platform and then executed, scaled, and billed in response to the exact demand needed at the moment.

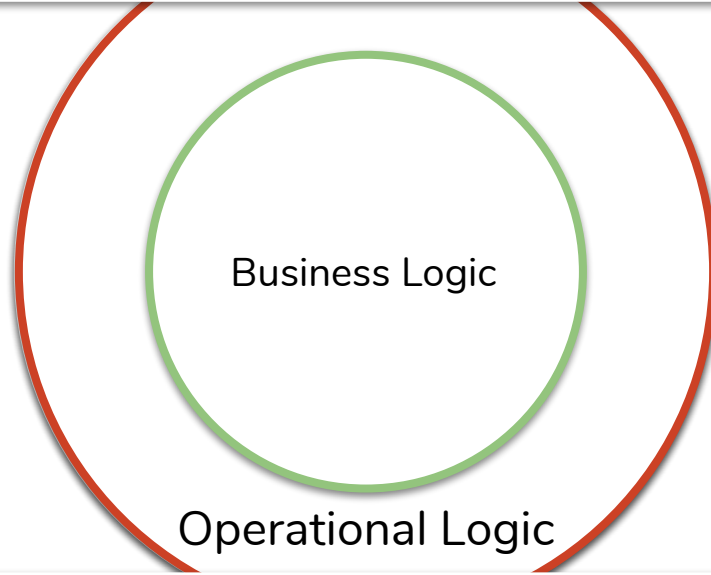


Business vs. operational logic



Joint Problem

Cloud users: reduce (complex) operational logic



Cloud providers: improve resource utilization

Publications



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

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Second International Workshop on Serverless Computing (WoSC@Middleware 2017)

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9th ACM/SPEC International Conference on Performance Engineering (ICPE 2018)

