Appendix -
Server-less Computing
(Function as a Service)

Roch Glitho, PhD
Professor and Canada Research Chair
My URL - http://users.ensc.concordia.ca/~glitho/
Server-less Computing (Function as a Service)

- Introduction
- Architecture
- Pros / Cons
Introduction

Server-less does not mean there is no server !!!

- There are indeed servers !!!
  - However the servers are completely transparent to the cloud users, unlike (Virtual Machine (VM), Containers, Uni-kernel)
    - Server-less computing might actually rely on VMs or containers or uni-kernels
  - Cloud users deal with functions
    - thus Functions as a Service (FaaS)
Architecture

Principles

1) Applications built as a set of functions
2) When there is a request for a given function, a run time environment (e.g. VM, container, uni-kernel) is launched with the function code + libraries
3) The run time is terminated after the execution of the function
Architecture (Reference 1)

Fig. 1. *Serverless platform architecture.*
Architecture

Load balancer:
- Self explanatory

Front end:
- End user interface

Message bus and scheduler:
- Mediation between front ends and execution engines
Architecture

Load balancer:
- Self explanatory

Front end:
- End user interface

Message bus and scheduler:
- Mediation between front ends and execution engines
  - Relies on a publication / subscription principles
Architecture

Execution engine:
- Self explanatory
  - Might rely on VM, containers and uni-kernels

Storage sub-system:
- States
- Persistent data
Pros (Examples)

- No real / virtual server management by cloud users
- Resource Efficiency and low cost
- Built-in scalability
Cons (Examples)

- **Most cited:**
  - Start up latency

- **Others:**
  - Learning curve of the new programming model (e.g. stateless functions + events)
Pros vs Cons

- Decision to be made on case by case basis (Ref. 1)
Pros vs Cons

- Decision to be made on case by case basis (Ref. 1)

![Cost comparison between Amazon Lambda (serverless) and Amazon EC2 (VMs) for spiky workload. In the gray region, serverless is 100x cheaper.](image-url)
References

The End