Provider-Side Serverless Opportunities

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Serverless Opportunities

Behavior Declaration

- Serverless computing is the first primitive where the provider understands the applications it runs
  - Relinquishes control of application provisioning and scaling to cloud provider
  - Forces applications to explicitly declare events
  - Higher level abstractions declare interactions between Serverless components (AWS StepFunctions, Microsoft LogicApps)

Behavior Prediction

- When a function will be executed
- When data will be fetched (IAM checks, database requests, ect.)
- Automatic CPU/memory allocations
  - Azure Functions already bills for memory used

Serverless Opportunities

Economic Pressures

- Cloud providers need to cost-compete by running datacenters more efficiently (utilization, energy-efficiency)
- Cloud customers seek to reduce cost by minimizing resource waste
    - Want needs of application to match allocated resources
    - Serverless computing is a large step forward

We're Not There Yet

- **"Never pay for idle, *or for wait*" – Ben Kehoe (Serverlessconf '17)**
    - Time spent waiting on network (function executions or otherwise) is wasted by both provider and customer
    - Provider must be allowed to free function resources in interim
        - What state to persist? (New APIs?)

Serverless Opportunities

Serverless State and Communication

- **“Permanent storage lives elsewhere” – Serverless Manifesto**
    - But stateful and/or communicative scenarios exist beyond simple fan-outs
        - How to enable stateful services in serverless platform?
        - Inter-function communication and addressing?
        - Networking-sensitive function placement (HPC scenarios)
    - Not permanent, but temporarily persistent and discoverable

Takeaways

- Serverless computing allows providers to understand customer applications, and to deliver value based on this information
    - Presents many design challenges
- Many scenarios/paradigms remain unexplored by providers