



# Going Cloud-Native: Serverless Applications With Apache Ignite

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# Agenda



- Serverless Computing with Ignite, any profit?
- Ignite connectivity options, which one to use and when?
- Demo: Creating an Ignite serverless function
- Ignite cluster deployment, self and managed service options?

# Serverless Computing With Ignite

## Any Profit?



# Primary Objective of Serverless Computing



cost savings

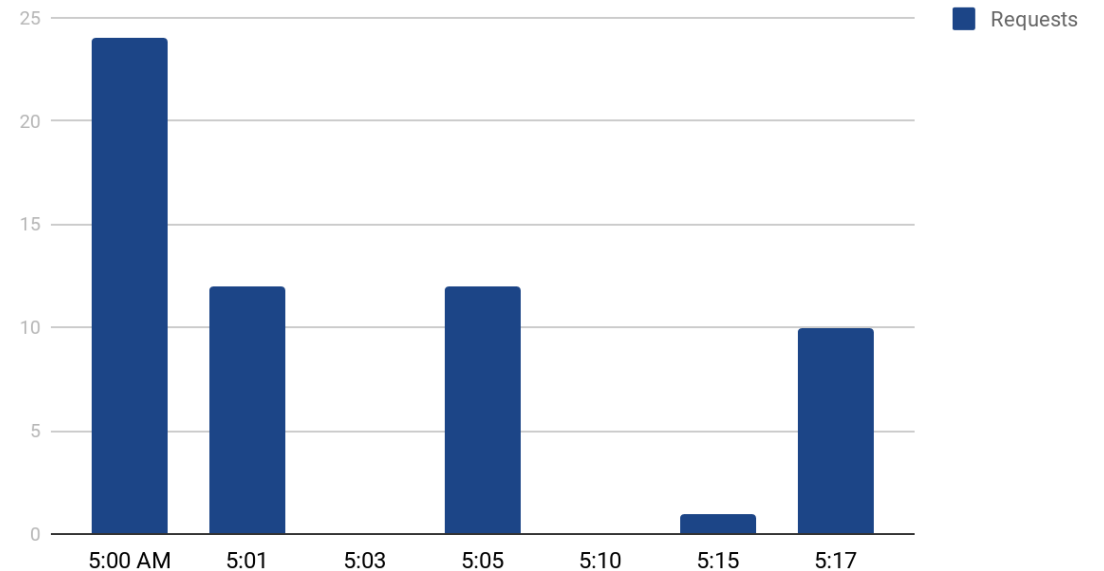
# Pay for Only What You Use



What are we charged for?

- requests count
- function duration
- managed service

Requests to Serverless Function



# Breaking Down The Duration



**duration = startup\_time + logic\_execution\_time**

# Breaking Down The Duration



**duration = startup\_time + logic\_execution\_time**

**logic\_execution\_time = local\_logic\_execution\_time + remote\_logic\_execution\_time**



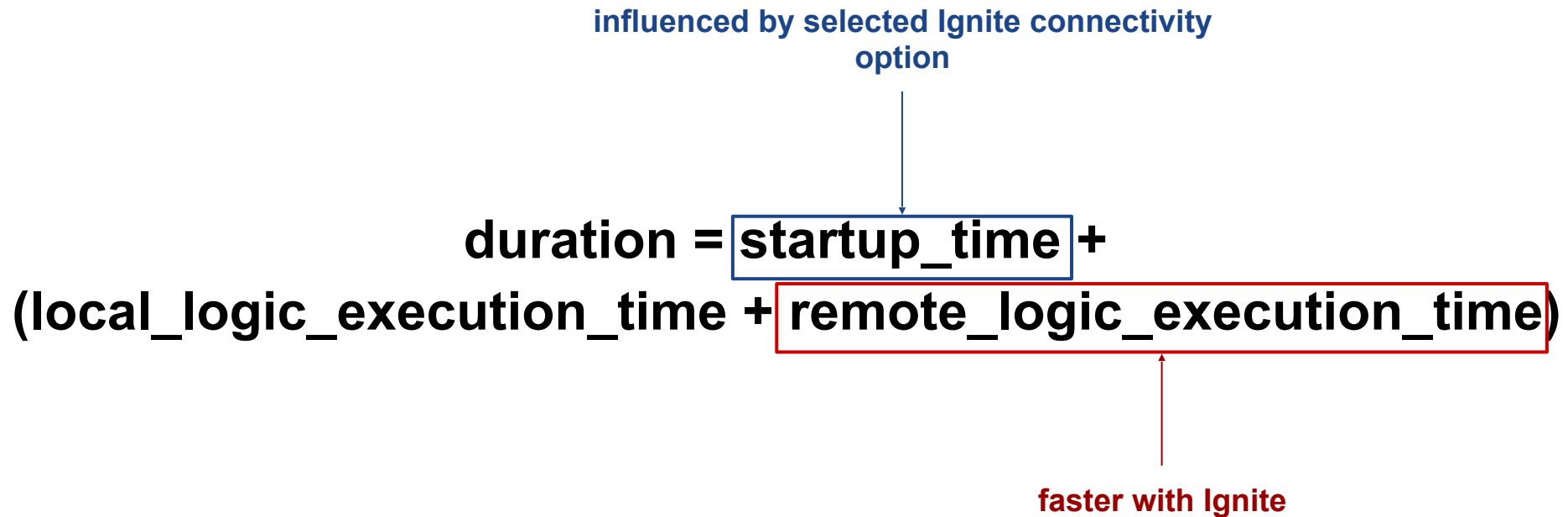
# Ignite Decreases Logic Execution Time

$$\text{duration} = \text{startup\_time} + (\text{local\_logic\_execution\_time} + \text{remote\_logic\_execution\_time})$$

faster with Ignite



# But You Need To Select Proper Ignite Connectivity Option



# Ignite Connectivity Options

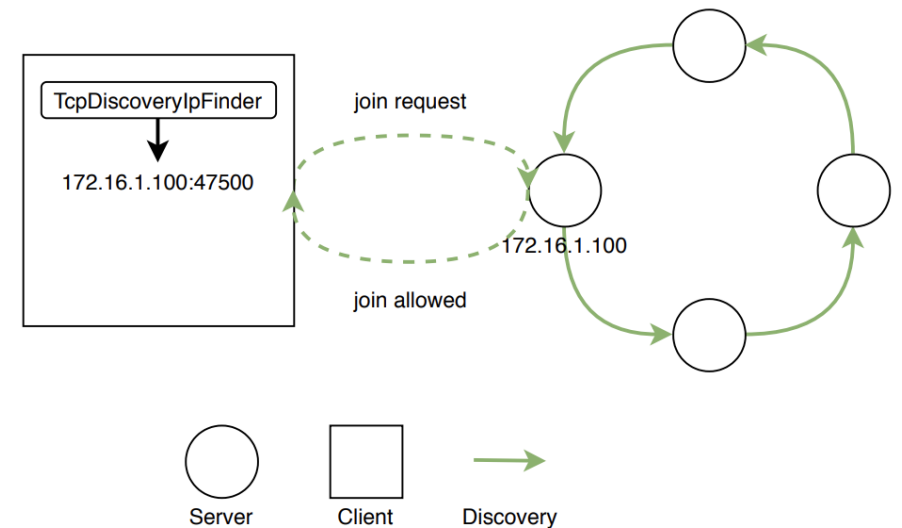
## Which one to use and when?



# Thick Clients: Not the best fit for serverless functions



- Slowest Startup Time
  - The client waits while all servers become aware of it
  - The more servers the longer the startup time
- .NET and C++ thick clients start the JVM

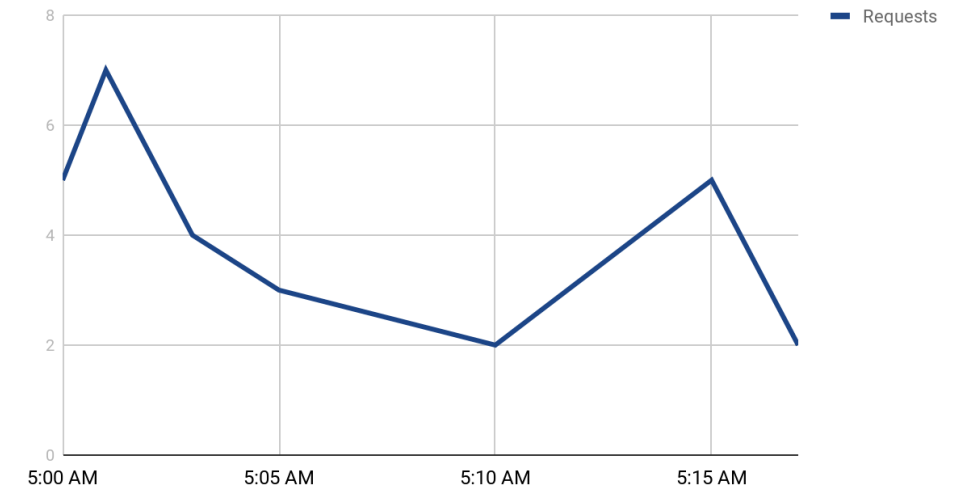


# Thick Clients: A couple of reasonable usage scenarios



- Function traffic is consistent
  - Function is not retired/unloaded frequently
- You need an API unsupported by other connectivity options
- Ensure the client doesn't accept TCP/IP connections:
  - [TcpCommunicationSpi.forceClientToServerConnections](#) must be set to **true**

Requests to Serverless Function

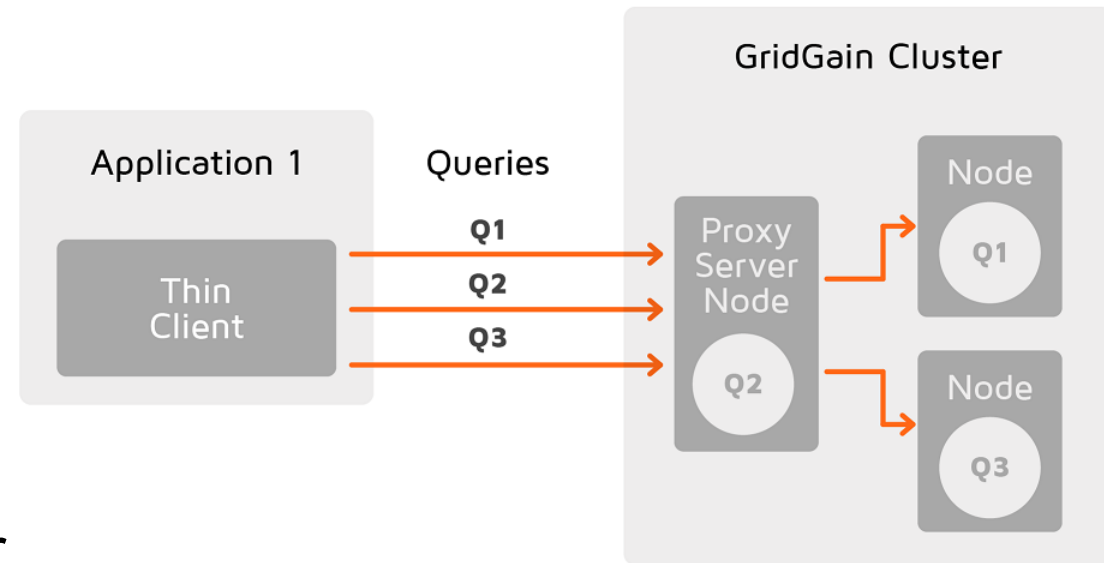


# Thin Clients

## Use by default in serverless environments



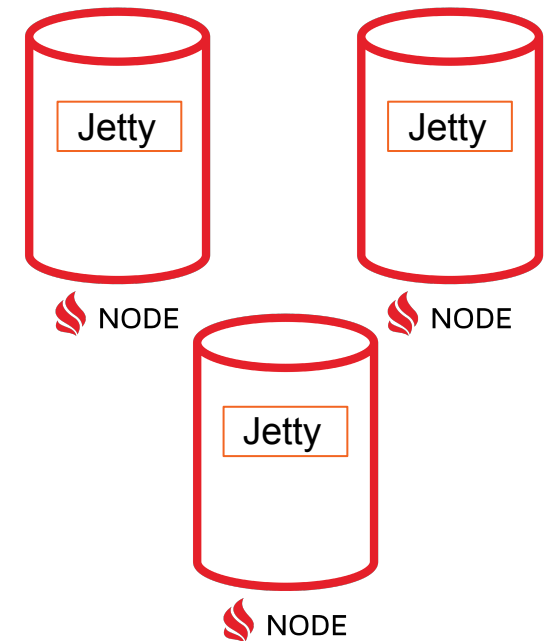
- Fast Startup Time
  - Just a TCP/IP connection with a server
- Cross-platform and lightweight
  - Java, .NET, Python, Node.js, etc.
- Feature-rich
  - Ignite 2.8: SQL, key-value, transactions
  - Ignite 2.9: compute, services and cluster
  - Ignite 2.10: continuous queries



# Ignite REST Protocol: Use to generate Graal VM native image



- Startup time is comparable to the thin client startup time
- Use with the GraalVM native image feature
  - To be supported for Ignite thin and thick clients
- Enable the **ignite-rest-http** module
  - <https://www.gridgain.com/docs/latest/developers-guide/restapi>



# Complete comparison of the connectivity options for serverless environments



	Thin Client (+ Ignite JDBC and ODBC)	Ignite REST API	Thick Client
Startup Time	✓	✓	✗
Multi-language	✓	✓	✓ (Java, .NET, C++)
Feature Set	✓ (subset)	✓ (subset)	✓
Partition-awareness	✓	✗	✓
Graal VM Native Image	✗	✓	✗

# Micronaut, Quarkus and Other Frameworks for serverless applications



- Prefer using the thin client or Ignite REST
  - To achieve fastest startup time
- Micronaut Integration
  - <https://cwiki.apache.org/confluence/display/IGNITE/Micronaut+Integration>
- Spring Boot integration
  - <https://apacheignite-mix.readme.io/docs/spring-boot>





# Demo

## Creating an Ignite serverless function



# Ignite Cluster Deployment

## Self and Managed Service Options?



# Self-Service: Kubernetes vs VMs



# Ignite Managed Service: GridGain Nebula



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## GridGain Nebula Capabilities



### Deploy Anywhere

Public(AWS, Azure, Google), private clouds, bare metal, on-premises or hybrid



### 24x7 Active Monitoring

Best practices built on tested GridGain DevOps processes



### Highly Secure

Controlled access and communication over the firewall

# Wrapping Up





# Additional Resources



- Tutorial: Deploying Ignite Serverless Functions
  - <https://www.gridgain.com/docs/tutorials/serverless/azure-functions-tutorial>
- Ignite with Micronaut Tutorial:
  - <https://www.gridgain.com/docs/tutorials/micronaut/getting-started/ignite-micronaut-getting-started>
- Serverless Architectures Deep-Dive:
  - <https://martinfowler.com/articles/serverless.html#WhatIsServerless>



# Stay connected with Apache Ignite users & experts

[meetup.com/Apache-Ignite-Virtual-Meetup/](https://www.meetup.com/Apache-Ignite-Virtual-Meetup/)





# Q&A

