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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?

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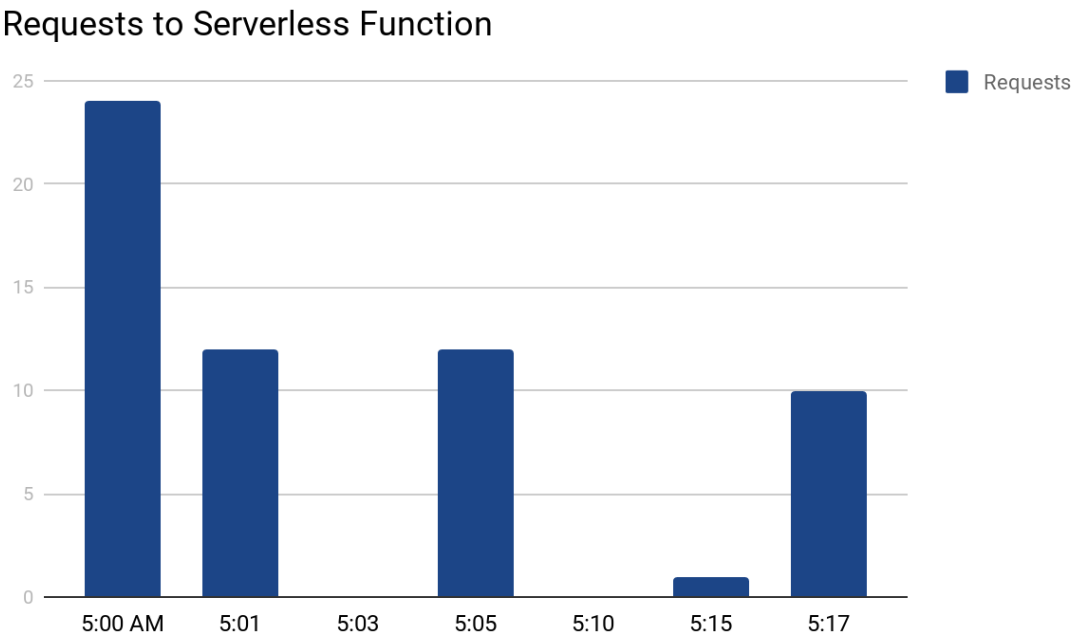
Primary Objective of Serverless Computing

cost savings

Pay for Only What You Use

What are we charged for?

- requests count
- function duration
- managed service



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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

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

faster with Ignite

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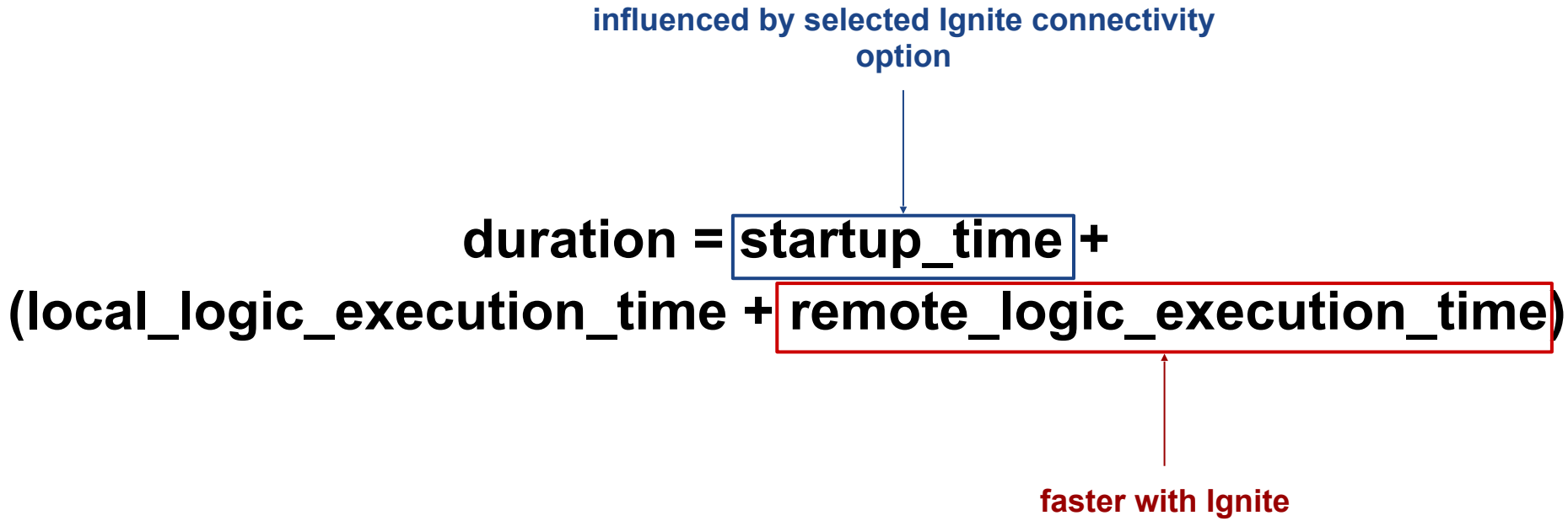
But You Need To Select Proper Ignite Connectivity Option



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Ignite Connectivity Options

Which one to use and when?

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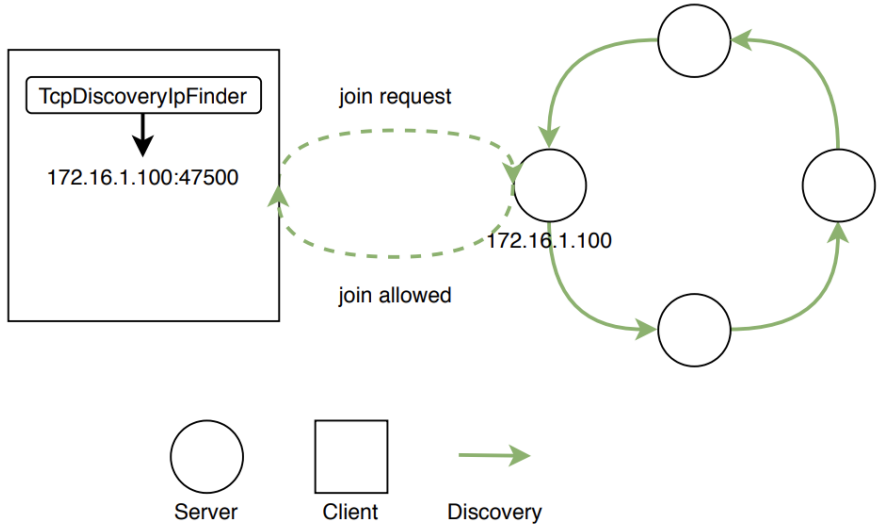
Thick Clients:
Not the best fit for serverless functions

- 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



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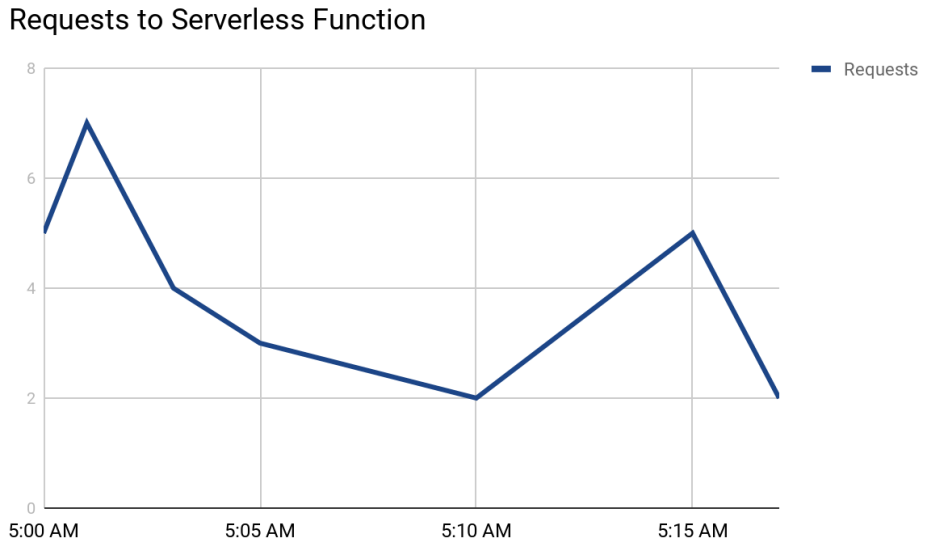
Thick Clients:
A couple of reasonable usage scenarios

- 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**



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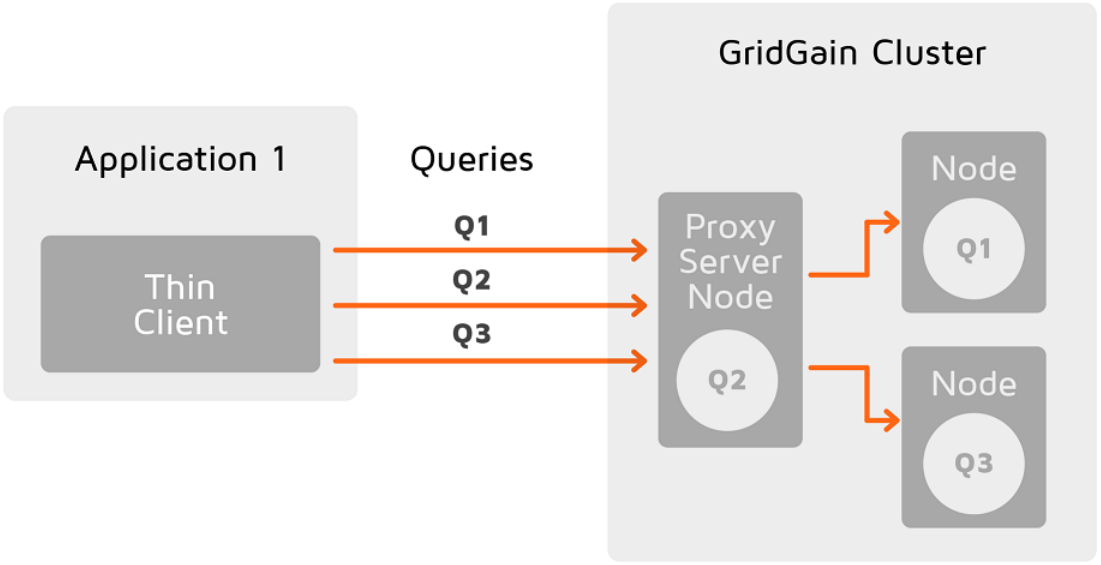
Thin Clients
Use by default in serverless environments

- 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



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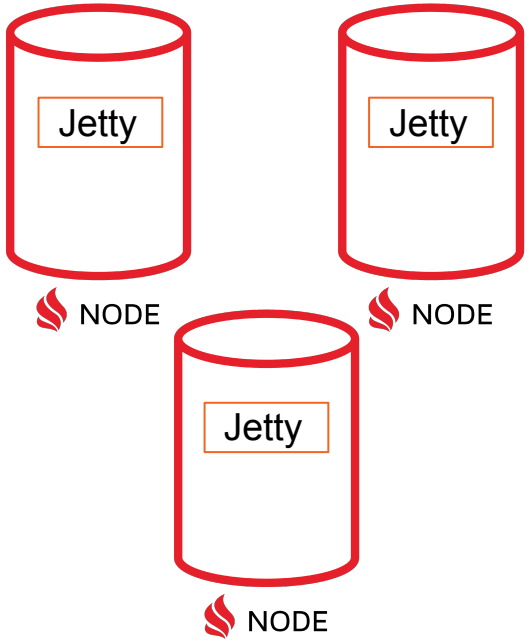
Ignite REST Protocol:
Use to generate Graal VM native image

- 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

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Ignite Cluster Deployment

Self and Managed Service Options?

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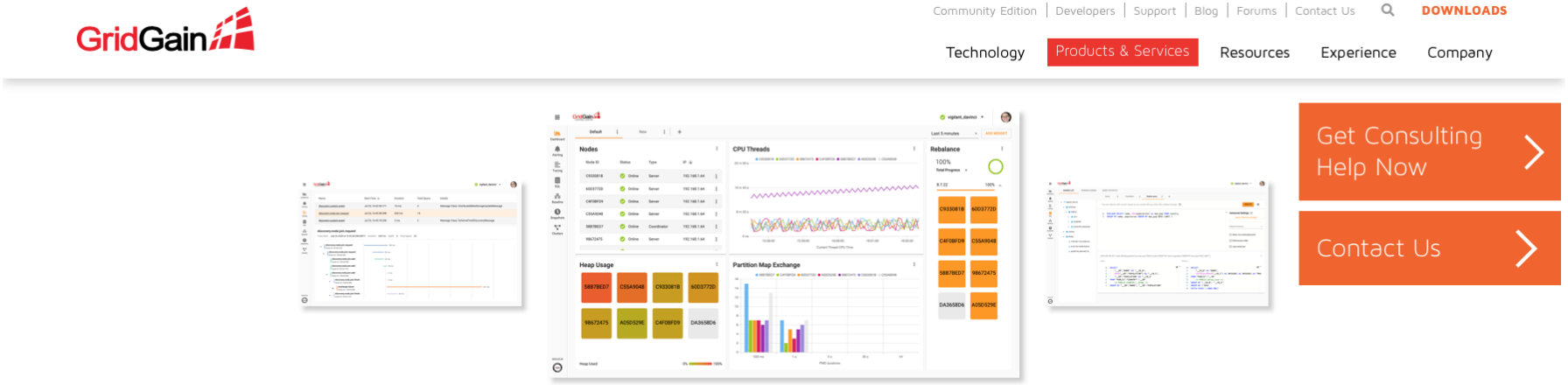
Self-Service: Kubernetes vs VMs

Ignite Managed Service: GridGain Nebula



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

https://www.gridgain.com/products/managed-services/gridgain-nebula

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Wrapping Up

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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

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meetup.com/Apache-Ignite-Virtual-Meetup/

Q&A

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