



Distributed Java Systems in Minutes with Hazelcast

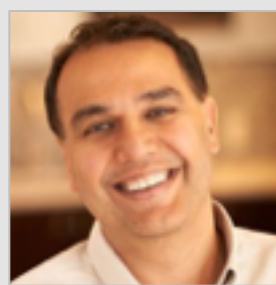
DAVID BRIMLEY
SENIOR SOLUTIONS ARCHITECT

What Is Hazelcast?

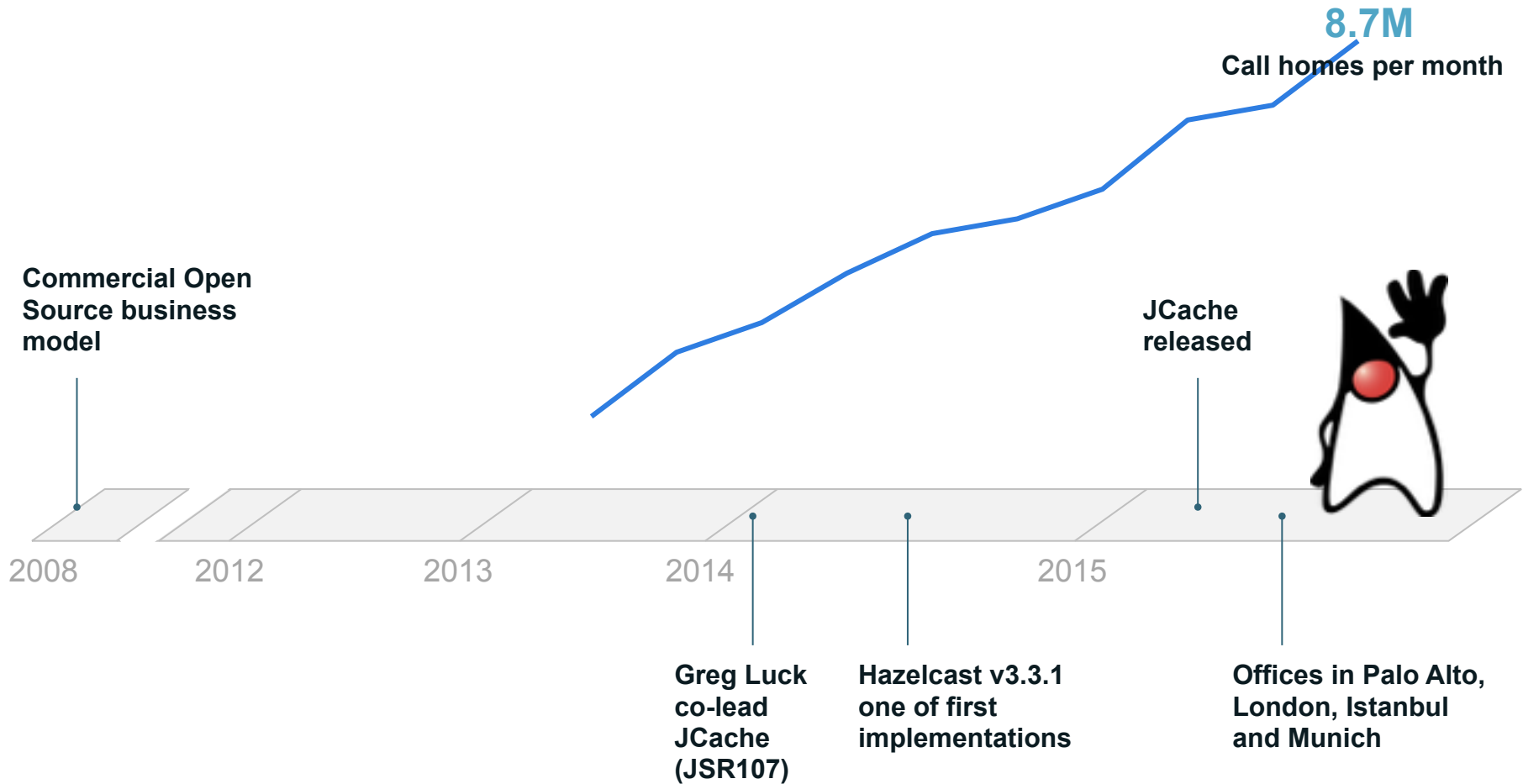
**Hazelcast is a distributed,
highly available and scalable
Open Source In-Memory Data Grid**

Company Snapshot

- Founded in 2008, 75 staff
- Commercial Open Source Business Model
- Gartner “Cool Vendor” 2012, Gartner IMDG 2015 Market Report, Forrester Wave Report IMDG 2015
- Board:
 - Greg Luck Hazelcast CEO, creator of Ehcache, JCache Spec Lead
 - Talip Ozturk, Hazelcast Founder
 - Roland Manger, Earlybird Venture Capital
 - Salil Deshpande, Bain Capital Ventures
 - Ali Kutay, former CEOs of WebLogic and Golden Gate Software
 - Rod Johnson, founder of Spring Source
- Headquarters in Palo Alto with offices in London, New York, Istanbul and Ankara



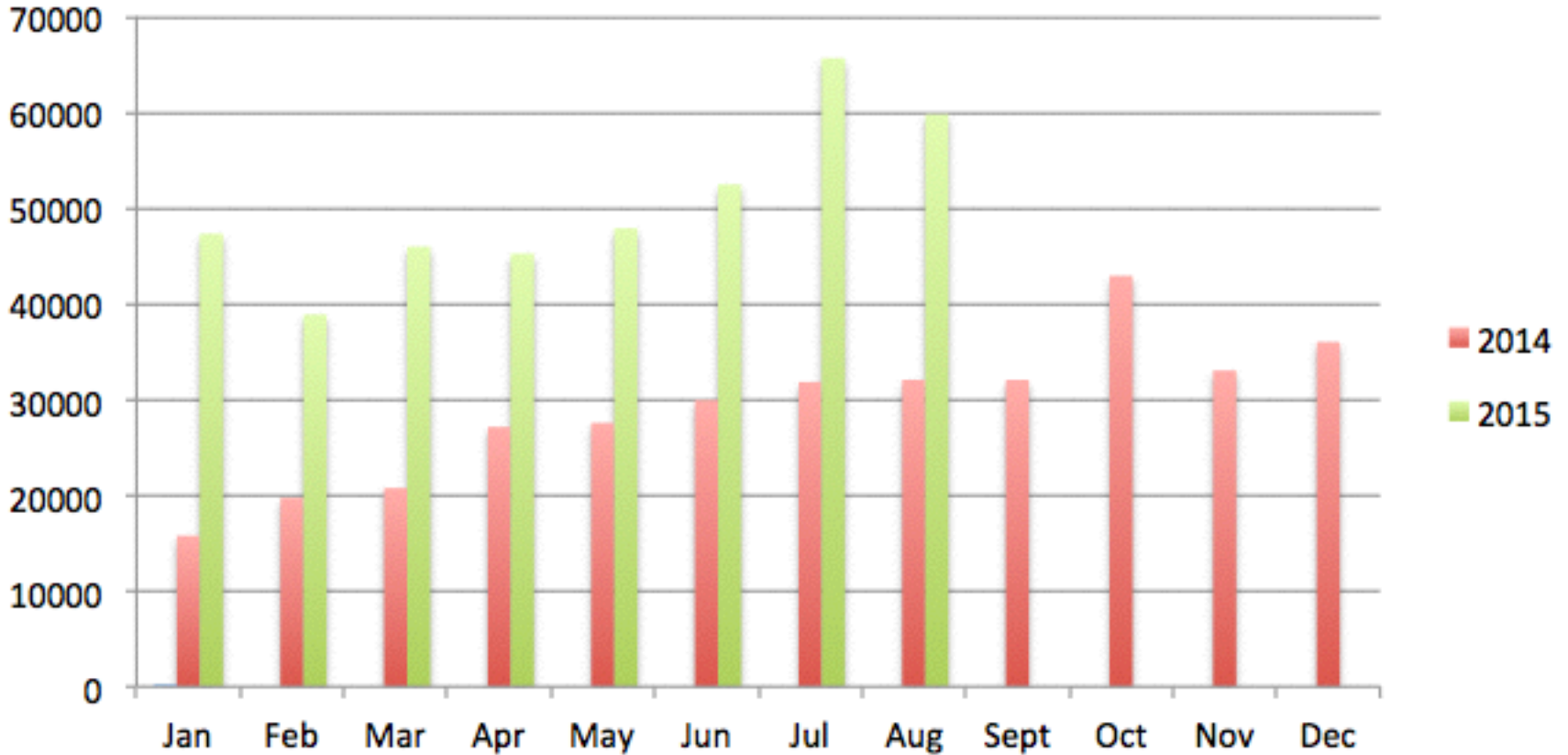
Hazelcast History





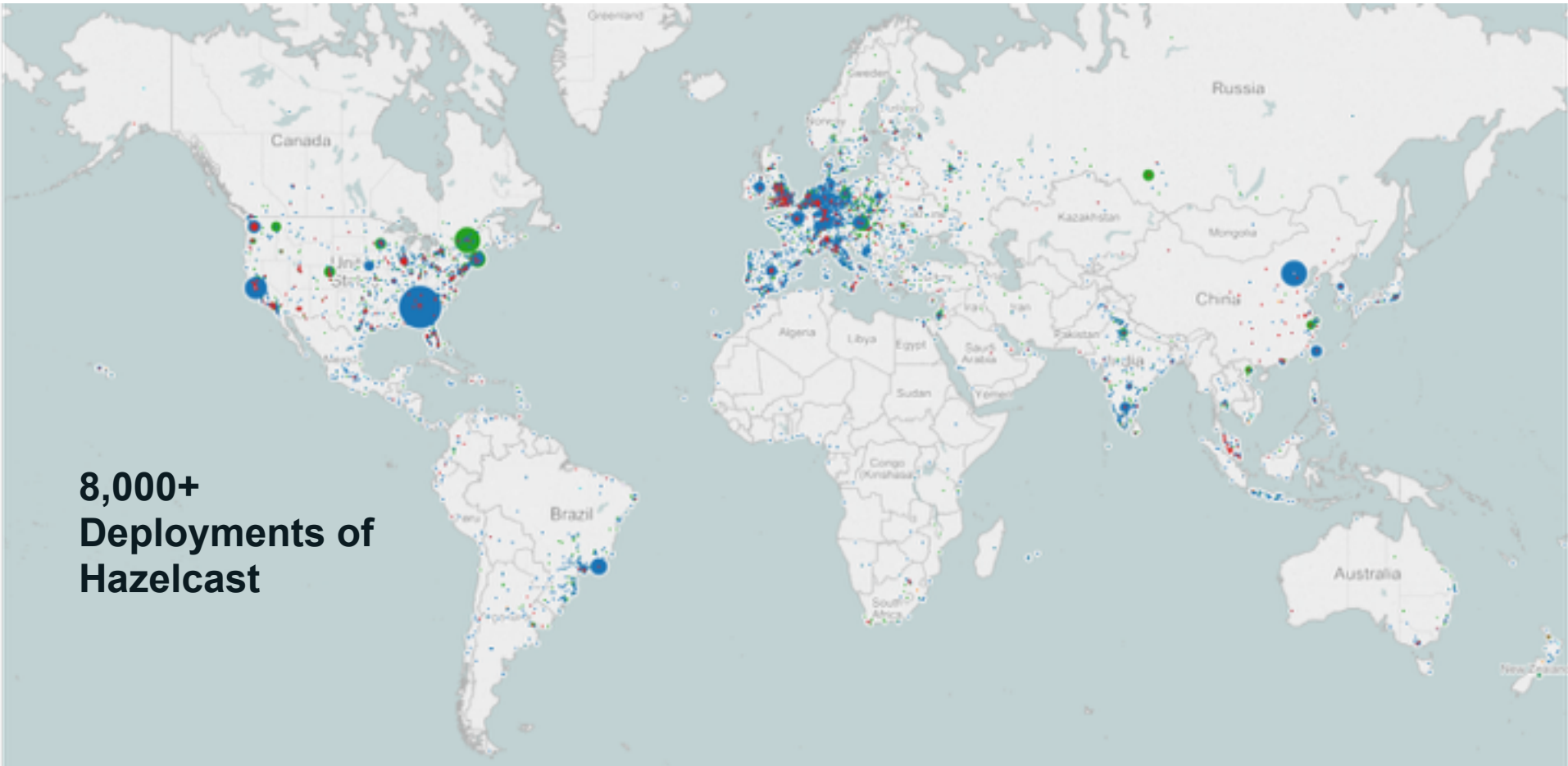
Usage Traction

Hazelcast Downloads per Month



Global Distribution of Deployments

From Tierra del Fuego to Iceland to Novosibirsk



8,000+
Deployments of
Hazelcast

Vibrant Open Source Community





Github: The Source for Hazelcast

Over 110 Contributors; Over 16,800 Commits

The screenshot displays the GitHub interface for the Hazelcast Incubator repository. At the top, the repository name "Hazelcast Incubator" is visible, along with navigation links for Pull requests, Issues, and Gist. Below this, the specific repository "hazelcast / hazelcast" is highlighted, showing statistics such as 15,950 commits, 9 branches, 81 releases, and 104 contributors. A table of recent commits is shown, including a merge pull request and several updates to sub-modules like checkstyle, findbugs, and hazelcast-all. On the right side, there are links for Code, Issues (402), Pull requests (44), Pulse, and Graphs. At the bottom right, there are buttons for "Clone in Desktop" and "Download ZIP".

Commit	Message	Time
Merge pull request #5579 from ahmetmiric/fix/3.6/approximateMAzSizeC...		
gurbuzali authored 9 hours ago		latest commit ff68abd965
checkstyle	Adds missing stat, related hazelcast/management-center#177	6 days ago
findbugs	findbugs and checkstyle	9 months ago
hazelcast-all	3.6-SNAPSHOT	15 days ago
hazelcast-build-utils	3.6-SNAPSHOT	15 days ago
hazelcast-client-new	Merge pull request #5583 from gurbuzali/fixes-double-serialization-ne...	9 hours ago
hazelcast-client	Merge pull request #5534 from gurbuzali/paging-predicate-improvements...	14 hours ago
hazelcast-cloud	3.6-SNAPSHOT	15 days ago
hazelcast-code-generator	3.6-SNAPSHOT	15 days ago
hazelcast-documentation	minor correcti...	2 days ago



Hazelcast Overview

Why Hazelcast?



Scale-out Computing enables cluster capacity to be increased or decreased on-demand



Resilience with automatic recovery from member failures without losing data while minimising performance impact on running applications

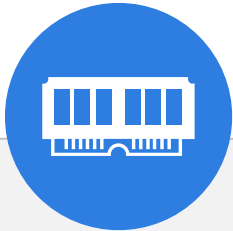


Programming Model provides a way for developers to easily program a cluster application as if it is a single process

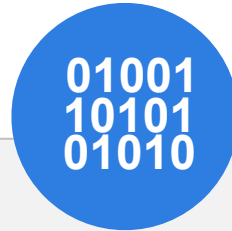


Fast Application Performance enables very large data sets to be held in main memory for real-time performance

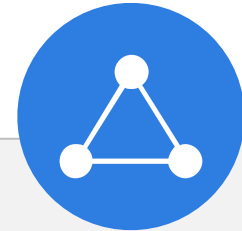
In Memory Data Grid



In Memory
Data **Storage**



In Memory
Data **Messaging**



In Memory
Data **Computing**

Hazelcast: Caching



- High-Density Memory Store, client and member
- Full JCache support
- Elastic scalability
- Super fast
- High availability
- Fault tolerance
- Cloud readiness

- In-memory access to frequently used data across an elastically-scalable grid
- Provide 100's of GB of near cached data to applications for massive scalability
- Dynamically cluster/pool memory and processors

High-Density Caching

Cache-as-a-Service

JCache Provider

Database Caching

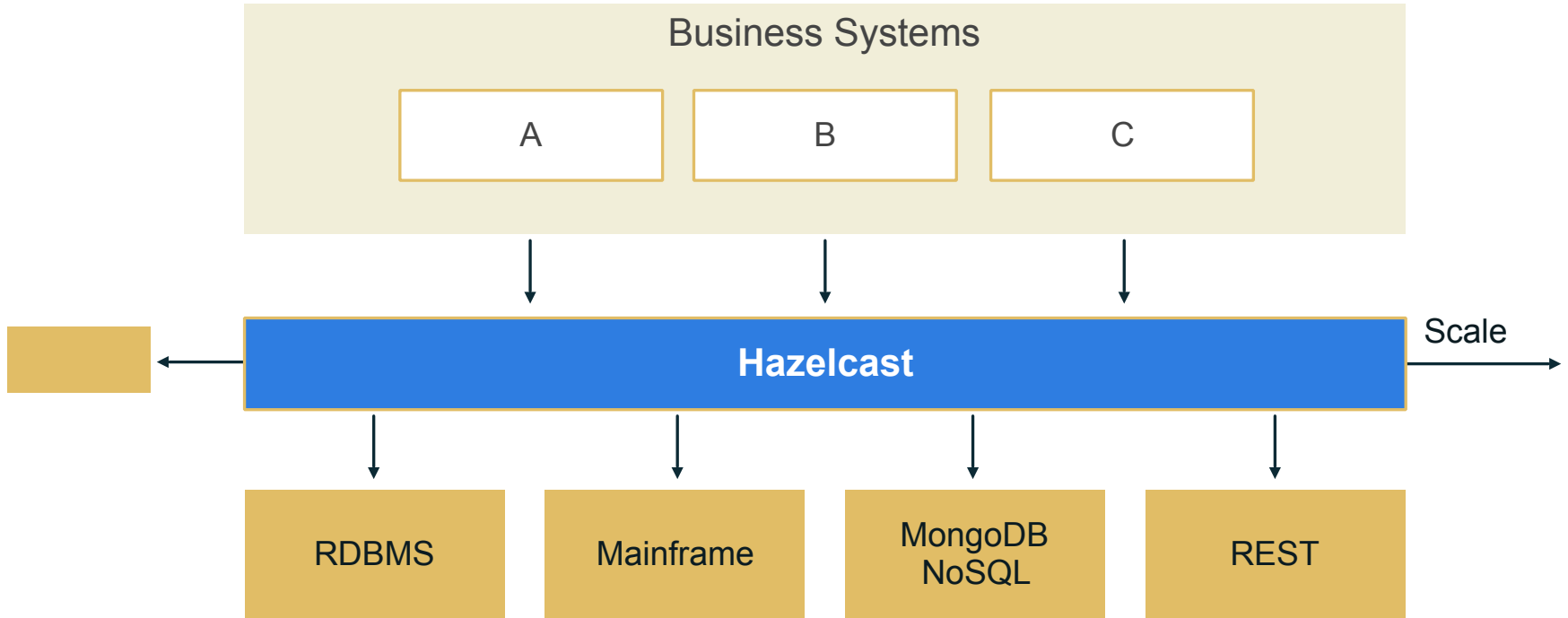
Hibernate Second Level Cache

Application Scaling

Software AG Terracotta Replacement

IM Data Store (Caching) Use Case

Database Caching Use-Case





Caching Demo

Hazelcast: In-Memory Data Grid



- Simple, modern APIs
- Distributed Data Structures
- Distributed Compute
- Distributed Clustering
- Object-oriented and non-relational
- Elastic and scalable – add/remove servers to use more/less CPU and RAM
- Transparent database integration
- Web-based Cluster Management

IMDG Messaging

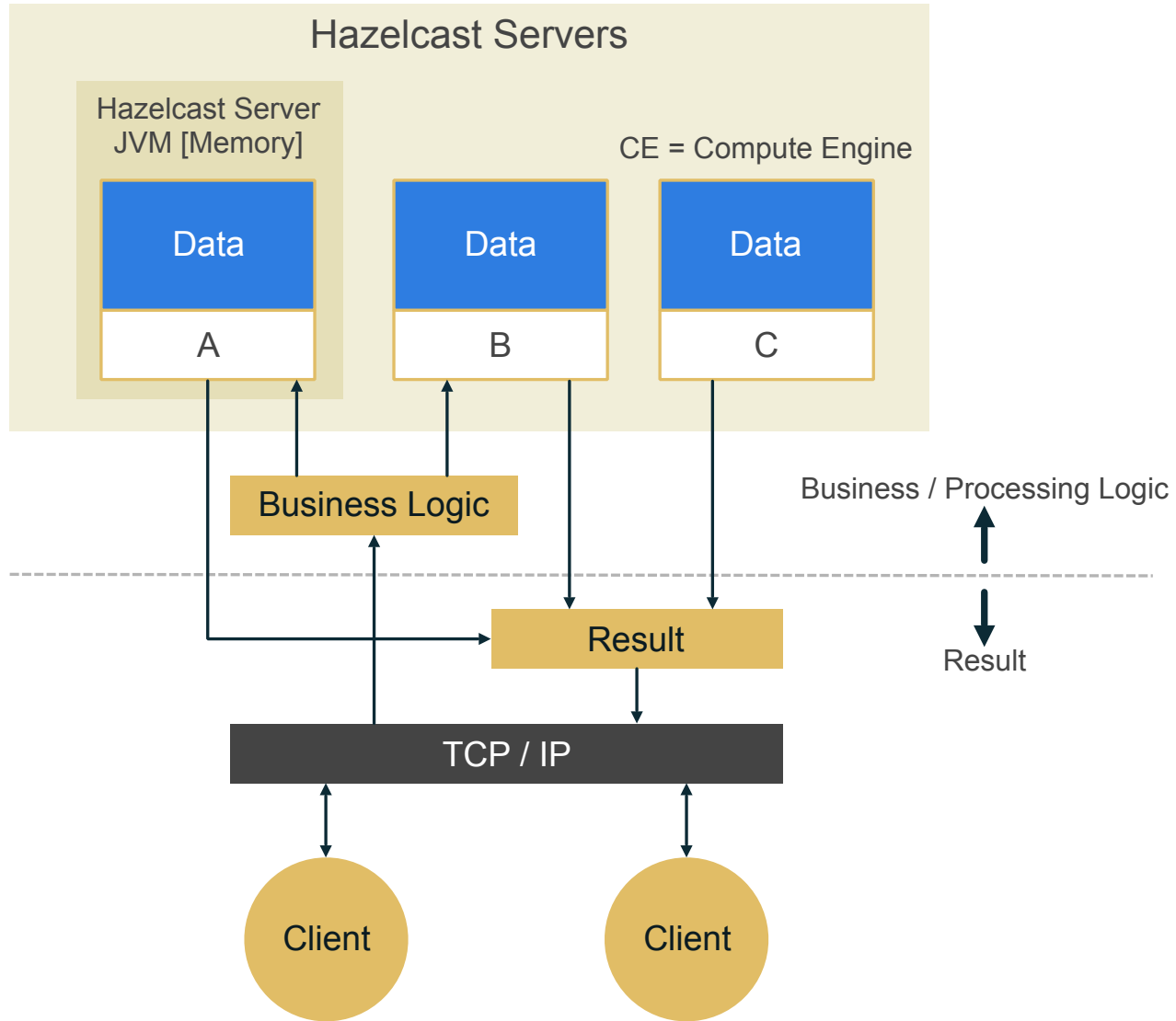
In-Memory Computing

Pivotal Gemfire
Replacement

Oracle Coherence
Replacement



IM Distributed Computing Use Case



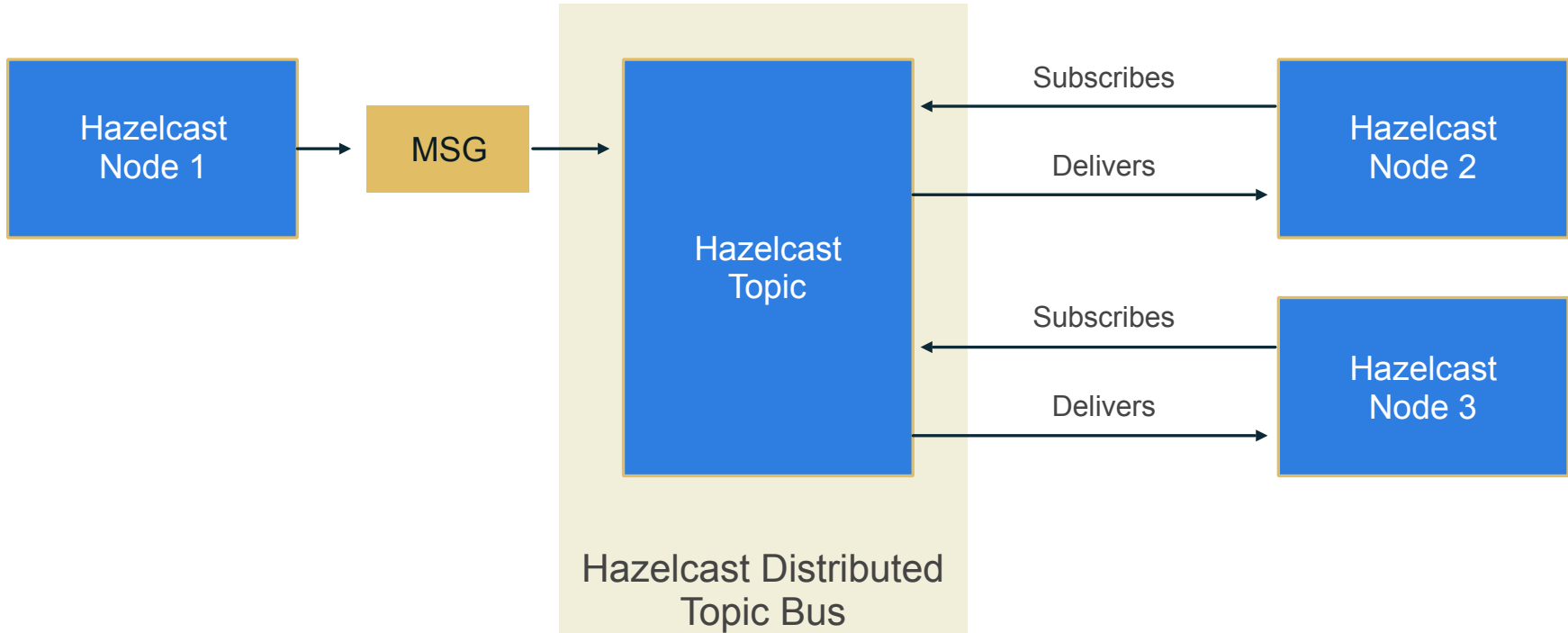


Distributed Compute Demo



IM Distributed Messaging Use Case

HD Cache	Dist. Compute	Dist. Message
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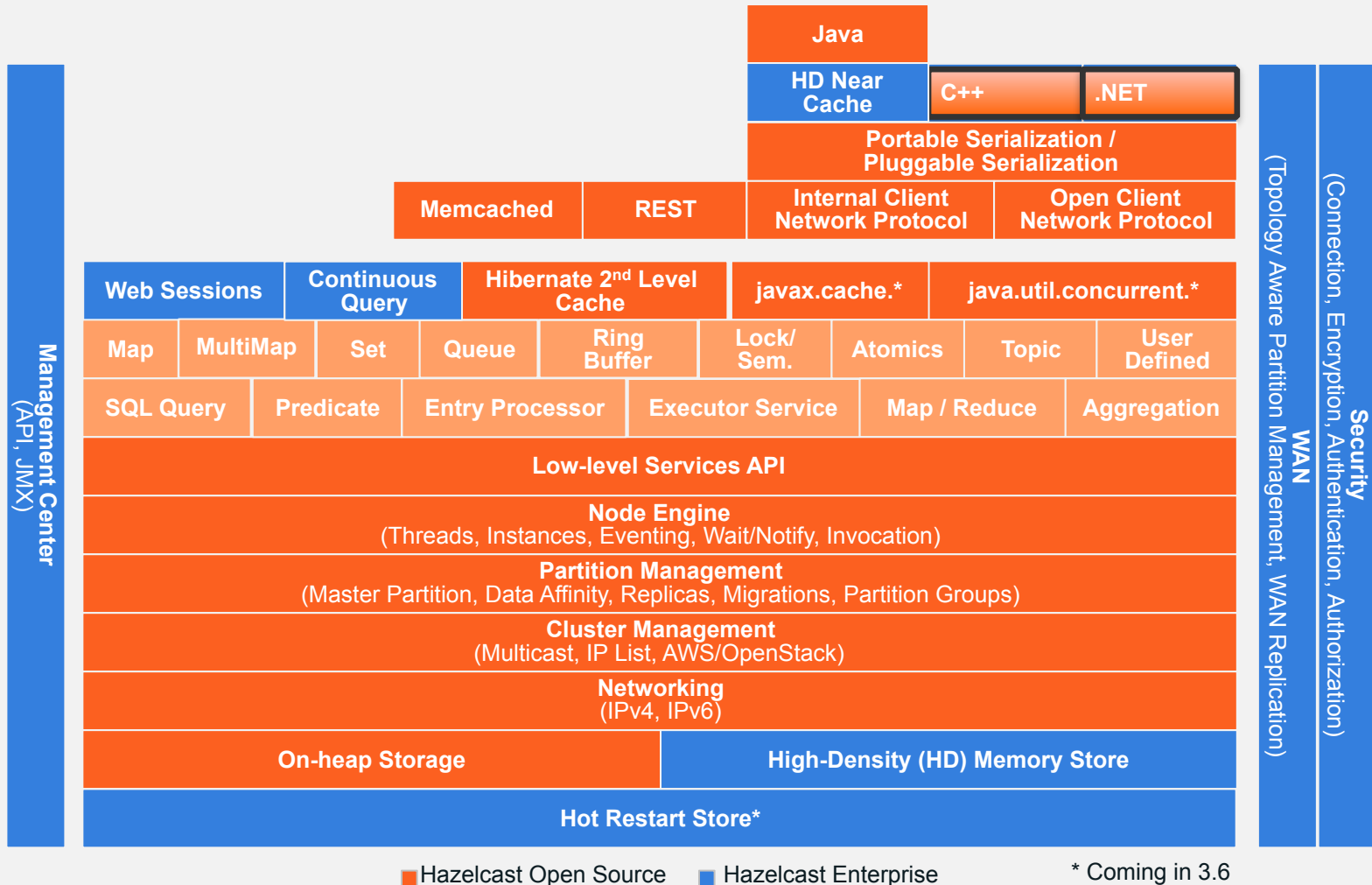
Distributed Messaging Demo



Feature Overview



Hazelcast Architecture



IM Data Store (Caching) Features

HD
Cache

Dist.
Compute

Dist.
Message

Java Collection API: Map, List, Set, Queue

JCache

High Density Memory Store

Hibernate 2nd Level Cache

Web Session Replication: Tomcat, Jetty

Predicate API: Indexes, SQL Query

Persistence: Map/Queue Store & Loader. Write Behind/Through

Eviction

Near Cache

Transactions: Local & XA

WAN & DR Replication

Memcached Interface

Java Concurrency API

(Lock, Semaphore, AtomicLong, AtomicReference, Executor Service, Blocking Queue)

Entry and Item Listeners

Entry Processor

Aggregators

Map/Reduce

Data Affinity

Continues Query

Map Interceptors

Delta Update



IM Distributed Messaging Features

HD Cache	Dist. Compute	Dist. Message
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Queue

Topic (Pub/Sub)

Event Listeners

Ring Buffers

EC2 Auto Discovery

Custom Pluggable Serialization

Portable Serialization

Partial Deserialization

Binary and/or Object Storage

JAAS Authentication and Authorization *

Socket Encryption *

Clustered JMX and REST Monitoring *

Cluster Quorum

Continues Query Caching

Hazelcast Cluster Protocol for different version support

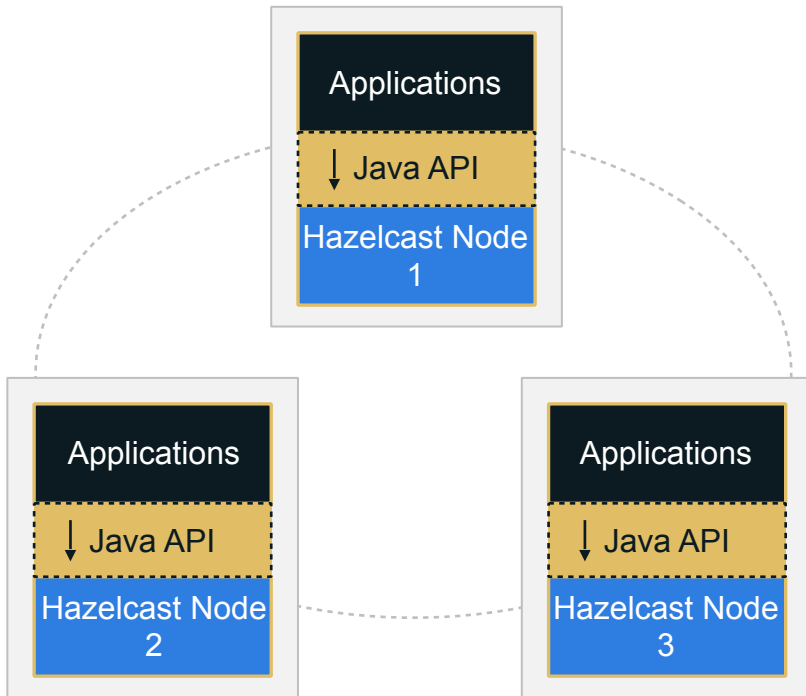
* Denotes Enterprise only feature



Deployment Strategies

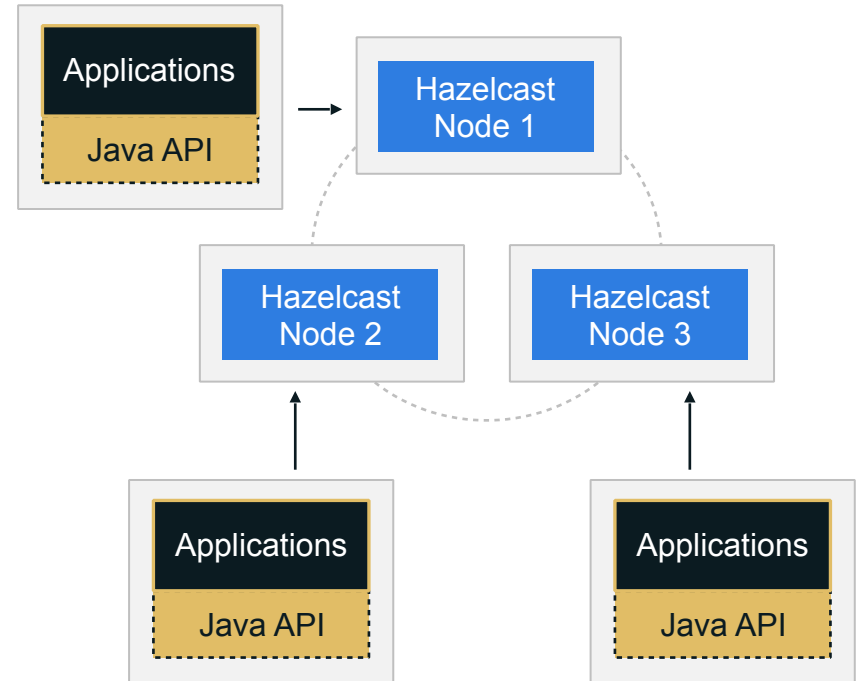
Deployment Options

Embedded Hazelcast



Great for early stages of rapid application development and iteration

Client-Server Mode



Necessary for scale up or scale out deployments – decouples upgrading of clients and cluster for long term TCO

Simulator is how we test Hazelcast.

It lets you:

- **Simulate** expected throughput/latency of Hazelcast with your specific requirements during pre-production phase of your deployment
- **Test** if Hazelcast behaves as expected when implementing new functionality in your project
- **Standardize** your application deployment process with a battery of rigorous tests
- **Ease** Hazelcast upgrades between versions using simulations to identify and remediate issues in advance



Hazelcast, The Company



Dual Licensing

Service & Support for **Open Source**; Advanced features for **Enterprise**

HAZELCAST BASIC SUPPORT	HAZELCAST PROFESSIONAL SUPPORT	HAZELCAST ENTERPRISE
<i>For rapid development of your application.</i>	<i>For service-level guaranteed operations and dev ops of your application.</i>	<i>For mission-critical performance and availability of scale-up & scale-out of your application.</i>
Access to solution architects that help you get the most out of the software and the best fit for your application.	Ensures smooth rollout and operation with 24x7 service-level agreement for service & support, code reviews, and support.	<p>Approx. 96% reduction in CPUs and Hazelcast nodes.</p> <p>100s GBs of near cache memory access for applications.</p> <p>Advanced replication and security features for large scale deployments.</p> <p>Access to purchase add-ons <i>High-Density Memory Store</i>, and <i>Cross Platform APIs and Clients</i>.</p>

INCLUDED IN BASIC	PROFESSIONAL ADDS	ENTERPRISE ADDS
<ul style="list-style-type: none"> • Management Center • 8x5 support window with a 12hr SLA • Email and IM support for one support contact • Access to patch-level fixes 	<ul style="list-style-type: none"> • 24x7 support window with a two-hour SLA • Email, IM, and phone support for up to two support contacts • Remote meetings with solutions architects • Code reviews 	<ul style="list-style-type: none"> • High-Density Memory Store & Near Cache Client • WAN Replication • JAAS Security • One-hour SLA • Quarterly review of feature requests • Quarterly review of the Hazelcast roadmap • Additional Clients: C++ and .Net

Hazelcast Feature Comparison

FEATURE COMPARISON		HAZELCAST BASIC	HAZELCAST PROFESSIONAL	HAZELCAST ENTERPRISE
DISTRIBUTED DATA STRUCTURES		✓	✓	✓
DISTRIBUTED PARALLEL COMPUTE		✓	✓	✓
DISTRIBUTED QUERY	Query	✓	✓	✓
	MapReduce	✓	✓	✓
	Aggregators	✓	✓	✓
	Continuous Query			✓
HIGH-DENSITY MEMORY STORE				✓
HIGH-DENSITY NEAR CACHE FOR JCACHE				✓
WAN REPLICATION				✓
JAAS SECURITY SUITE				✓
SMART CLIENTS	Java	✓	✓	✓
	.NET			✓
	C++			✓
MANAGEMENT	per-node statistics and JMX APIs	✓		✓
	Management Center	optional with subscription		✓
	Cluster-wide JMX and REST APIs			✓
SERVICE & SUPPORT	Support Window Service-level Agreement	8to5 support window with a 12hr Service-level Agreement	24x7 support window with a 2hr Service-level Agreement	24x7 support window with a 1hr Service-level Agreement
	Quarterly Review of Feature Requests			✓
	Quarterly Review of the Hazelcast Roadmap			✓
	Email, IM, and Phone Support for Up To Two Support Contacts	Support for one support contacts	Support for up to two support contacts	Support for up to two support contacts
	Remote Meetings with Solutions Architects		✓	✓
	Code Reviews		✓	✓
	Access to Patch-level Fixes	✓	✓	✓



Stay in touch.



FREE

Half Day Hazelcast Essentials Training

Thursday 19th November, Canary Wharf

<https://hazelcast.com/events/london-hands-training-class-4/>



Hazelcast User Group London (HUGL)

<http://www.meetup.com/Hazelcast-User-Group-London-HUGL/>



Thank You

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