A Deep Learning Approach to Automatic Call Routing

Rajiv Shah
Director of Solution Architect and Professional Services
About GigaSpaces

We deliver the fastest big data analytics processing platform to run your analytics & machine learning in production, at scale.

- **300+** Direct customers
- **50+/500+** Fortune / Organizations
- **5,000+** Large installations in production (OEM)
- **25+** ISVs
ABOUT THE USE CASE

This use case shows how to modernize existing software architecture for an efficient call center routing workflow.

USE CASE BENEFITS:

- Enhance Customer Experience with automatic routing that prevents customers from being buried in a hierarchical menu.
- Reduce Average Handle Time for optimized efficiency.
BUSINESS CHALLENGES

- Improve Customer Experience
  - Faster call routing to the correct agent means a more satisfied customer

- Reduce Costs: lower AHT
  - Faster call resolution:
    - Faster routing
    + Routing to correct agent

- Enhanced System Agility
  - Higher agility when adding new categories or departments
Event Driven Architecture based on prediction criteria is required for optimal performance supporting peak events.

Leveraging existing opensource frameworks such as BigDL in a unified platform simplifies architectural complexity.

Continuous model training based on previous transcribed calls + automatic training of alternative models ensure models with higher scoring.
Automatic routing to the right agent for the perfect personalized experience

User speaks using web interface
Browser converts speech to text and sends to controller
Controller writes data to InsightEdge and to Kafka topic
Spark job listens on Kafka topic and using BigDL model, creates prediction
BiGDL writes Prediction to InsightEdge data grid
InsightEdge event processor listens for Prediction data and routes call session

Stop Pressing 0 Or *
Operationalizing AI Example – Automatic Call Routing

- Call Voice Recognition UI
- Call Session Routing UI

- Kafka
- Streaming Job
  - Spark
  - Intel BigDL Classification Algorithm
  - Classified Speech

- XAP
  - In-Memory Computing

- In-process calls
- Classified calls
LIVE DEMO: Instant Insight to Action

- Run Deep Learning with BigDL on transactional data in real-time for instant insights
- Trigger transactional workflows based on prediction criteria and scoring for real-time business impact
- Simplify architecture, eliminate GPU requirements & reduce component and cluster sprawl for optimal performance & TCO
Automatic Call Routing

Call Center BigDL/InsightEdge module
Click on the microphone icon and begin speaking.

In-process calls (Powered by Intel BigDL)

<table>
<thead>
<tr>
<th>Id</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>comp.os.mac/hardware</td>
</tr>
<tr>
<td>2</td>
<td>comp.os.mac/hardware</td>
</tr>
<tr>
<td>3</td>
<td>comp.os.x86-64-windows.mssel</td>
</tr>
<tr>
<td>4</td>
<td>comp.os.x86-64-windows.mssel</td>
</tr>
</tbody>
</table>

Call sessions

<table>
<thead>
<tr>
<th>Id</th>
<th>Category</th>
<th>Agent Id</th>
<th>Time (sec)</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>comp.os.mac/hardware</td>
<td>1</td>
<td>64</td>
<td>My Mac is just a***</td>
</tr>
<tr>
<td>2</td>
<td>comp.os.x86-64-windows.mssel</td>
<td>7</td>
<td>67</td>
<td>My Microsoft computer sex</td>
</tr>
<tr>
<td>3</td>
<td>comp.os.x86-64-windows.mssel</td>
<td>0</td>
<td>94</td>
<td>Hey I have a problem with my Mac</td>
</tr>
<tr>
<td>4</td>
<td>comp.os.x86-64-windows.mssel</td>
<td>4</td>
<td>114</td>
<td>Hello I have a problem with my windows</td>
</tr>
</tbody>
</table>
RESULTS

Performance:
Average ~50ms routing

Accuracy:
Between 75%-85% accuracy

Continuous Training:
Background processing and training of ~10 minutes to create a new model
GigaSpaces Coverage

The insideBIGDATA IMPACT 50 List for Q3 2019

#37 GigaSpaces - In-memory Computing Platform

GigaSpaces adds 'data lake accelerator' to its InsightEdge in-memory computing platform

MARCH 12 2019
By Csilla Zsigri, Matt Aslett

GigaSpaces has a long track record of providing in-memory data processing for data grid and cache use cases. With the latest enhancements to its InsightEdge Platform, it aims to further simplify and accelerate big data processing for instant business insights.

GigaSpaces Coverage

Operationalizing real-time ML and DL with GigaSpaces, Intel Analytics Zoo, and Optane DC Persistent Memory

PUT AI TO WORK
April 15-18, 2019
New York, NY

How NLP is helping a European financial institution enhance customer experience

Strata Data Conference
29 April–2 May 2019
London, UK

See passes & pricing

20th Banking Technology Awards

Golden Bridge Awards

IT World Awards

Network Products Guide

Business World

Gold
GigaSpaces Competitive Edge

- **SPEED**
  - Any Data
  - Live, Transactional & Historical Data
  - Deploy Anywhere

- **SCALE**

- **ANALYTICS**
Data Analytics: Undeniable Value to your Business

- **Dynamic Pricing**: Helps grow sales by 30% annually
- **Optimized Operations**: Saves $100sK in annual savings (banking example)
- **Predictive Maintenance**: Reduces maintenance costs by up to 75% per mile (transportation example)
- **Personalized Recommendation**: Increases conversions by up to 20X for brick & mortar stores via location-based promotions
- **Risk Analysis**: Reduces loan losses by 10-30%
- **Fraud Analytics**: Reduces losses by 3 to 5% in mature environments and by over 30% in evolving contexts
- **Call Center Automation**: Increases efficiency by over 90%
“To prevent fraud, anomaly detection needs to happen against 500,000 txn/sec in less than 200 milliseconds.”

“A typical e-commerce website will experience 40% bounce if it loads in more than 3 seconds, including personalization offers.”

“A call center receives 450,000 calls/day, each call needs to be routed in less than 60 milliseconds.”
Use Cases Spanning Industries Benefit from Near Real-time AI Decision Support Systems Built on GigaSpaces

**FINANCIAL SERVICES**
- Fraud
- Credit risk scoring
- Customer 360
- Customer churn

**INSURANCE**
- Usage based insurance
- Customer 360
- Customer churn
- Claims management

**RETAIL ECOMMERCE**
- Personal recommendations
- Intelligent inventory mgmt.
- Customer 360
- Locations-based promotions

**TRANSPORTATION**
- Predictive maintenance
- Fleet management
- Customer 360

**INDUSTRIAL IOT**
- Inventory planning
- Customer 360
- Predictive maintenance

**MEDIA/TELCO**
- Customer 360 (incl. churn)
- Intelligent call center routing
- Data Center Infrastructure Monitoring (DCIM)
- Predictive maintenance

**INSURANCE**
- Usage based insurance
- Customer 360
- Customer churn
- Claims management
InsightEdge: Unifying Real-Time Analytics, AI and Transactional Processing in One Platform

- Rich ML & DL support
- Extreme performance
- Fully Transactional
- ACID Compliance
- Enterprise-grade (Security, High Availability)
- Co-located Apps and Services
- Seamless integration with Big Data ecosystem
  - Data sources (Kafka/Nifi/Talend/etc.)
  - Data lakes (S3/Hadoop/etc.)
  - BI tools (Tableau/Looker/etc.)
Traditional vs. Unified “Translytical” Processing

**Traditional**
- Transactional Processing
- Analytical
- Data Replication
- Slow Feedback Loop

**Unified**
- Transactional Processing
- Analytical
- In-Memory Data Grid
- Fast Feedback Loop

**Impacts**
- Real-time analytics
- Greater situation awareness
- Simplified architecture
UNIFYING Analytics and Transactional Processing at SCALE & SPEED

BI TOOLS
- tableau
- looker
- Qlik

DATA LAKE
- Amazon S3
- Cloudera

DATABASE & DATA WAREHOUSE
- MySQL
- cassandra
- MongoDB

APPLICATIONS
- MOBILE
- WEB
- IOT

BI & VISUALIZATION
- Grafana
- Apache Zeppelin
- SQLJDBC
- NOTEBOOK

ANALYTICS, MACHINE & DEEP LEARNING
- Spark
- TensorFlow
- Caffe
- Torch
- SQL

CORE
- MULTI MODEL STORE
  - OBJECTS, JSON, KEY-VALUE, TABLES, TEXT, GEO SPATIAL, GRAPH
- EVENT PROCESSING
- PERSISTENT MEMORY

IN-MEMORY DATA GRID

SECURITY AND AUDITING

MANAGEMENT AND MONITORING

REST ORCHESTRATION

APPLICATIONS

BI TOOLS

DATA LAKE

DATABASE & DATA WAREHOUSE

APPLICATIONS

ON-PREMISE

CLOUD

HYBRID

IN-MEMORY DATA GRID

CLUSTER MANAGEMENT & SERVICE DISCOVERY

BI TOOLS

DATA LAKE

DATABASE & DATA WAREHOUSE

APPLICATIONS

ON-PREMISE

CLOUD

HYBRID

IN-MEMORY DATA GRID

CLUSTER MANAGEMENT & SERVICE DISCOVERY
Your data is immediately searchable, queryable, and available for analytics

- Single logical view for hot, warm and cold data
- Hot data resides on in-memory data grid and historical data on HDFS/Object Store
- Hot data is mutable and historical data is immutable (parquet)

Fast Access
- Fast access to frequently used historical data

Access any data through a unified layer
- Analytics (Spark ML)
- Query (Spark SQL)

Automatic lifecycle management
- Automatically handles the underlying data movement, optimization and deletion
Ultra-low latency and high throughput transactional processing
IMDG

Partitioned In-Memory Grid
Shared-nothing, linear scalability, elastic capacity

Co-Location of Data and Business Logic
Co-located ops, event-driven, fast indexing

Event-Driven Processing and Map/Reduce
No Downtime
Auto-healing, multi-data center replication, fault tolerance

Fast Indexing Multi-Data Model
POJO, .NET, Document/JSON, Geospatial, Time-series

Seamless Integration with Java/Scala ecosystem
Cloud, Kubernetes, Docker Native

IN-MEMORY DATA GRID
EVENT PROCESSING
DATA MODELS (SPATIAL, POJO, JSON)
RAM
SSD STORAGE
SPERSISTENT MEMORY
DATA REPLICATION & PERSISTENCE
WEB CONTAINERS
RPC & MAP/REDUCE

CLUSTER MANAGEMENT & SERVICE DISCOVERY

ON-PREMISE
CLOUD
HYBRID
Co-located Analytics and AI with Transactional Processing

Distributed SQL-99
Real-time integration with Tableau and Business Intelligence tools
JDBC driver

Spark for ML and leading DL frameworks
Push-down predicate for ultra-low latency filter (30x faster)
Shared RDDs/DataFrames
Streaming with 99.999% availability
Deep Learning with Intel BigDL
Graph processing, text mining, geospatial
Benchmark (in IOPS)

- Persistent Memory +249% than SSD
- RAM (off-heap) +350% than SSD

- Persistent Memory +159% than SSD
- RAM (off-heap) +180% than SSD
Costs Analysis for 5GB usable data

- CAPEX reduction of up to 50% with RAM off-heap vs. on-heap
- CAPEX reduction of up to 75% with AEP vs. RAM on-heap
- OPEX reduction by X10
Tiered Storage Architecture
Higher Performance – Optimized TCO

$10X$ less expensive than only RAM maintaining in-memory performance

Define which data resides on which layer per class and per field

Figure 2: Memory-Storage Hierarchy with Persistent Memory Tier
Kubernetes and Docker
The Lambda Architecture is complicated, involving layers such as Batch, Speed, and Management. Data sources include files, message bus, databases, social data, and sensor data. Applications can be deployed on public clouds like AWS, Azure, and GCP, as well as on private clouds. The architecture uses tools like Apache Nifi, Apache Flume, Apache Airflow, Talend, Informatica, Attunity, StreamSets, AWS Kinesis, Kafka, Event Hubs, Google Pub/Sub, CDC, Message Bus, and Spark Streaming for data capture, movement, and processing. Storage & cache components include S3, Serverless (e.g., AWS Lambda), Kafka consumers, Google Pub/Sub, Azure Cosmos DB, MongoDB, and Redis. The control layer manages, orchestrates, and secures the architecture.
• No ETL, reduced complexity
• Built-in integration with external Hadoop/Data Lakes S3-like
• Fast access to historical data
• Automated life-cycle management
Leverage leading BI Platforms

Tableau

Looker

Qlik

Power BI
### YCSB

**Workload A:** Update heavy  
This workload has a mix of 50/50 reads and writes.  

**Workload B:** Read mostly  
This workload has a 95/5 reads/write mix.  

**Workload C:** Read only  
This workload is 100% read.

### Per Node

- Replication Factor: 2  
- Record size: 1KB  
- RAM: 32GB  
- CPU: 16 cores  
- Disk: 1.2TB SSD

### NoSQL vs. GigaSpaces

<table>
<thead>
<tr>
<th></th>
<th>Workload A 50/50 Read/Write</th>
<th>Workload B 95/5 Read/Write</th>
<th>Workload C 100 Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBase</td>
<td>1600</td>
<td>2300</td>
<td>2500</td>
</tr>
<tr>
<td>IE SSD</td>
<td>174,419</td>
<td>320,336</td>
<td>336,549</td>
</tr>
<tr>
<td>IE PMEM</td>
<td>428,861</td>
<td>797,287</td>
<td>838,223</td>
</tr>
<tr>
<td>IE RAM</td>
<td>1,219,968</td>
<td>2,292,240</td>
<td>2,411,382</td>
</tr>
</tbody>
</table>

**X100 Faster**
GigaSpaces is now focused on in-memory data processing... The combination of Spark and XAP will enable GigaSpaces to target the new breed of real-time analytics and hybrid operational and analytic workloads.

InsightEdge contains all the necessary SQL, Spark, Streaming, and Deep Learning toolkits for scalable data-driven solutions... our preferred solution components: the three-tier Kappa model, including Spark and Kafka, as implemented by GigaSpaces, in combination with its commercial InsightEdge platform.

Everyone Wants “Real-time Analytic Insights” But Which Architecture Will Get You There?
CASE STUDY: Fast Global Fabric for Risk, Trading and Market Data

BUSINESS CHALLENGE:
• Prior to executing a trade, a credit check needs to run and guarantee that the counterparty is not exceeding their limit

TECHNICAL CHALLENGE:
• Complete control over all eTrading platforms
• Regulatory enforcement set by RISK rules on all users trades on a daily basis
• Regulation analysis and checks
• Client onboarding
• Traversal framework
• Referential data for other apps

IMPLEMENTATION:
• All reservations, limits and client data is stored in the GigaSpaces in-memory platform
• All the requests are executed via the platform
• GigaSpaces is used in front of the database to speed up data access
• A worldwide deployment is done (Paris, NY and London) with GS asynchronous replication between each site to populate the data in NY and London

RESULTS:
• Three sites with 99.999 HA, replicated WW (Paris, London, New-York and Hong Kong)
• Reduced cluster and component sprawl
• Real-time risk analysis and credit checks complying with regulations
• Efficient scalable multi data-centre architecture
• Read: 700 K per day
• Write/Update/Remove: 20 K per day
• Next phase is to add ANOTHER site (TOKYO)
CASE STUDY: DYNAMIC PRICING & OPTIMIZATION

BUSINESS CHALLENGE:

• Demand forecasting and price optimization in real-time based on threshold changes

TECHNICAL CHALLENGE:

• Ingest ~ billion of records in minutes
• Ability to query data from multiple geographies in real-time at low latency
• Ability to update with low latency multiple locations to adjust forecast and influence
• Cloud nativeness

RESULTS:

• Agility: Reduced forecasting ingestion from 3 hours to 8 minutes
• Live interactive querying and analytics through Spark SQL < 150ms latency
CASE STUDY: BOOKING AND FLIGHT AVAILABILITY

BUSINESS CHALLENGE:

- Flight availability forecasting real-time based on various factors: date, city pair, #seats requested, marketing class, Point of Sale (PoS), quota limits, traffic restrictions, etc.

TECHNICAL CHALLENGE:

- Various internal systems (Reservation, Shopping, eCommerce Systems)
- Open API for external systems: Airlines, Global Distribution Systems (GDSs) and BOTs (automated searching).
- Auto scaling and sub-sec latency
- Multi tenancy (small/med/large airlines)

RESULTS:

- Querying and analytics response time < 50ms latency
- High Performance with up to 200K transaction/sec
- Scaling Near Linear (X100)
- Increase throughput by X& and reduce network overhead by 10%

Ratio of Bookings per Availability Requests increases by 100
CASE STUDY: PriceRunner
Compares Prices for Millions of Offers in Milliseconds

BUSINESS CHALLENGE:
• PriceRunner receives prices from 18,000 different merchants and has 4.4 million unique visitors per month, needed to ensure real-time comparisons for their customers at high peak periods such as the night before Black Friday where traffic increases between 10-20 times the normal traffic.

TECHNICAL CHALLENGE:
• Support scalability requirements at peaks without compromising performance
• No downtime
• Real-time analytics on transactional data
• Event-driven applications powering integrated applications
• Microservices architecture for rapid development and deployment

“Innovation is a key tenant of our strategy, and adoption of GigaSpaces InsightEdge real-time machine learning technology will highly differentiate our services by enabling us to run advanced analytics models on our hot data and instantly predict prices to improve the customer experience.”

Roger Forsberg, CTO
PriceRunner

18,000 different merchants
200 million prices updates
1 Billion requests a month
5-8 millisecond performance
CASE STUDY:  
Real-Time Pricing Engine

BUSINESS CHALLENGE:
- Dynamic pricing engine based on CO2 tax regulations for B2B and B2C
- Many car configurations are unique, but all parts are not significant for CO2 calculation

TECHNICAL CHALLENGE:
- The current pricing engine workload is around 60 to 80 calculations/s, expected to increase to 2000
- Pricing calculations are obsolete after 24 hours.
- Each CO2 returned value must be exact
- All requests (both internal and external) must be equally treated

RESULTS:
- Querying and analytics response time < 100ms latency
- Reduce infrastructure footprint by a factor of X4-6
- Scaling up by X20

Pricing Requests increases by **20x**
USE CASE:

SMART AGENT ASSISTANCE

BUSINESS CHALLENGE:
- Enhance customer experience with quicker First Call Resolution
- Reduce Average Handle Time for optimized efficiency

TECHNICAL CHALLENGE:
- Ingestion of millions of CRM cases and data from other repositories into a unified analytics platform
- Leveraging ML models in real time
- Continuous model training

Reducing mean time to resolution by 5-10X
Average time of 50ms to search and find similar cases
CASE STUDY: Fraud and Money Laundering Detection in Real-time

BUSINESS CHALLENGE:
- Detecting fraud on mobile payment applications in real-time
- Detecting the deposit of the same check in multiple accounts at different banks in real-time
- User experience: application availability 24×7
- TCO reduction: reduce dependency on expensive RDBMS (Oracle)

TECHNICAL CHALLENGE:
- IMC Platform to ingest 4 TB of data daily
- Fully consistent transactional In-Memory Map-Reduce
- Millisecond response
- Analyze and validate against a large dataset of live (multiple TB) in memory and archived data (to Cassandra NoSQL and Hadoop)

RESULTS:
- Sub-second response for accurate fraud detection to stop the transaction
- TCO Reduction: RAM and SSD for runtime data compared to Oracle DB or SAN
- Fault-tolerant, highly available, scaling on demand

Ingest 4 TB daily
Handle 1.5M events per second
CASE STUDY: Instant Payments for real-time transactions and high reliability to enhance the overall customer experience

BUSINESS CHALLENGE:
- Enable and accelerate instant payment solutions and meet regulatory requirements on a global scale
- Automatically track purchases and other server-to-server communication in real time
- Store payment transactions, order information and other sales internally

TECHNICAL CHALLENGE:
- Ability to handle added data volumes 15k payment/sec receipts introduced by management of new SEPA European payment regulation
- Assure no-downtime for mission critical service

RESULTS:
- Running low-latency payment and business logic calculations
- No downtime assured
- Real-time analytics and Machine Learning - preventing fraud and adherence to regulations
- Design to deployment in just a few months leveraging microservices architecture

Payment transaction in 500 milliseconds
End-to-end validation in seconds
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- Ingestion of millions of CRM cases and data from other repositories into a unified analytics platform
- Leveraging ML models in real time
- Continuous model training

Reducing mean time to resolution by 5-10X
Average time of 50ms to search and find similar cases
1 sec from data to insight to action

Millions of IOPS

10X less expensive than only RAM with In-memory performance

No Downtime at leading enterprise customers for Years

And still counting
WHY GIGASPACE?

- Real-time insights
- Boost your performance
- Simplify your architecture
- Lower TCO / Enhance ROI
Enterprise Grade System of Record

Optimized Data Replication: Field-proven, reliable, high performance replication mechanism to replicate data between peer nodes in the data grid

Data Partitioning: Transparent content-based data partitioning to evenly and intelligently distribute data across your cluster

Transaction Support: Full transaction support, including local, distributed and XA transactions

Write Behind: Asynchronous and reliable propagation of data to any external data source

Locking Support: RDBMS locking and transaction isolation for robust and hassle-free data access

Multi-Site Deployment: Replicate and share data between multiple, geographically-distributed, active clusters for global activity

Network Segmentation Protection: Ensure data remains consistent in case of network segmentations of all types

Security: Role-based authentication for data and operations, Support for Kerberos, Spring, TLS and more

Aggregations: Sum, Avg, Min, Max, GroupBy and more, or even your own user-defined aggregations

SQL Functions: Abs, Round, Length, Upper, Lower and more, or even your own user-defined functions

Advanced Querying & Indexing

Querying: Sophisticated query engine with support for SQL and example queries

Projection API: Customize the query’s result set by defining which fields should be returned

Geospatial: Enhance your data model with shapes and use spatial operations to find matches

Full Text Search: Go beyond plain text with regular expressions, fuzzy search, proximity matching and more

Indexing: Predefined and add-hoc Property indexing for fast data access

Change API: Update data by specifying only the required change instead of the entire updated object

GeoSpatial: Enhance your data model with shapes and use spatial operations to find matches

Aggregations: Sum, Avg, Min, Max, GroupBy and more, or even your own user-defined aggregations

SQL Functions: Abs, Round, Length, Upper, Lower and more, or even your own user-defined functions
Data Model Flexibility & Interoperability

**Native:**
Highly optimized, POJO driven API which exposes all the unique capabilities of the platform

**.Net:**
Native C# interface that enables any .NET application to access the data grid

**JPA:**
Support data grid access using the standard JPA API for seamlessly scaling your JEE data access layer

**Document:**
Completely schema-free data API that supports upgrading the application’s data model on the fly

**Cross Language Access:**
Support for heterogeneous environments, with seamless interoperability among them all

**Key-Value:**
Simple and intuitive Map-based interface for simple caching scenarios

**Messaging & Event Features**

**Publish/Subscribe Messaging:**
Propagation of any event that takes place in the data grid to listeners using the publish/subscribe paradigm

**Point-to-Point Messaging:**
Support for implementation of complex workflows and triggering of processing logic across the data grid

**Content Based Routing:**
Routing of events to relevant cluster members based on their content

**Workflow Support:**
Implement complex workflows using event propagation and sophisticated event filtering

**Durable Notifications:**
Fully durable pub/sub messaging for data consistency and reliability

**FIFO Groups:**
Ensure in-order and exclusive processing of events belonging to the same group, while parallelizing across groups

**REST API:**
Standard REST endpoint provides access to the data grid from any app, Platform and programming language
<table>
<thead>
<tr>
<th>Collocation of Data and Business Logic</th>
<th>Grid Health Transparency &amp; Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spring on Steroids:</strong> Deployment, provisioning and proactive management of any spring application, with or without a data grid</td>
<td><strong>REST Admin API:</strong> Comprehensive and intuitive API for monitoring and controlling every aspect of your cluster and application</td>
</tr>
<tr>
<td><strong>Code and Data Collocation:</strong> Deployment of business logic and data as a single coherent unit for optimized performance</td>
<td><strong>Single Click Deployment:</strong> Support for distribution, provisioning and management of application deployments across any number of hosts</td>
</tr>
<tr>
<td><strong>Master-Worker Support:</strong> Intuitive and highly scalable master-worker implementation for distributing computation-intensive tasks</td>
<td><strong>Application Dependencies:</strong> Deploy modules as an application ensuring order of deployment</td>
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<td><strong>Dynamic Code Execution:</strong> Dynamic code shipment and map/reduce-like execution across the grid for optimized processing and data access</td>
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<tr>
<td><strong>Robust Remoting Support:</strong> Built on top of the data grid to provide fault tolerance, service auto discovery, cluster wide invocations and more</td>
<td><strong>Client side Cache Monitoring:</strong> Discover client-side cache and views connected to your spaces</td>
</tr>
</tbody>
</table>
THANK YOU

BUILD IT

TRY IT

GIGASPACES
innovate with confidence