Apache Ignite™ - In-Memory Data Fabric
Fast Data Meets Open Source

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Agenda

• About In-Memory Computing
• Apache Ignite (tm) In-Memory Data Fabric
  • Advanced Clustering
  • Data Grid
  • Compute Grid
  • Service Grid
• Ignite For Analytics
  • Streaming & CEP
  • Share State Across Spark Jobs
  • In-Memory MapReduce
  • Interactive SQL
  • DevOps: Yarn and Mesos
• Q & A
Apache Ignite™ In-Memory Data Fabric: Strategic Approach to IMC

- Supports Applications of various types and languages
- Open Source – Apache 2.0
- Simple Java APIs
- 1 JAR Dependency
- High Performance & Scale
- Automatic Fault Tolerance
- Management/Monitoring
- Runs on Commodity Hardware
- Supports existing & new data sources
- No need to rip & replace
In-Memory Data Fabric: More Than Data Grid

- Data Grid
- Compute Grid
- Service Grid
- Streaming
- Hadoop Acceleration
- Advanced Clustering
- File System
- Messaging
- Events
- Data Structures
Apache Ignite: Complete Cloud Support

• Automatic Discovery
  – Simple Configuration
  – AWS/EC2/S3
  – Google Compute Engine
  – Other Clouds with JClouds

• Docker Support
  – Automatically Build and Deploy
Data Grid: JCache (JSR 107)

- JCache (JSR 107)
  - Basic Cache Operations
  - ConcurrentMap APIs
  - Collocated Processing (EntryProcessor)
  - Events and Metrics
  - Pluggable Persistence
- Ignite Data Grid
  - ACID Transactions
  - SQL Queries (ANSI 99)
  - In-Memory Indexes
  - Automatic RDBMS Integration
Data Grid: Partitioned Cache
Data Grid: Replicated Cache

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Data Grid: Off-Heap Memory

- Unlimited Vertical Scale
- Avoid Java Garbage Collection Pauses
- Small On-Heap Footprint
- Large Off-Heap Footprint
- Off-Heap Indexes
- Full RAM Utilization
- Simple Configuration
Data Grid: Ad-Hoc SQL (ANSI 99)

- ANSI-99 SQL
- Always Consistent
- Fault Tolerant
- In-Memory Indexes (On-Heap and Off-Heap)
- Automatic Group By, Aggregations, Sorting
- Cross-Cache Joins, Unions, etc.
- Ad-Hoc SQL Support
### SQL Cross-Cache JOIN Example

```java
IgniteCache<AffinityKey<UUID>, Person> cache = ignite.cache("persons");

// Execute query to get names of all employees.
SqlFieldsQuery qry = new SqlFieldsQuery(
    "select concat(firstName, ' ', lastName), org.name " + 
    "from Person, ""Organizations".Organization as org " + 
    "where Person.orgId = org.id");

QueryCursor<List<?>> cursor = cache.query(qry);

for (List<?> row : cursor)
    print(row);
```
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### SQL Cross-Cache GROUP BY Example

```java
IgniteCache<AffinityKey<UUID>, Person> cache = ignite.cache("persons");

// Query to get salaries grouped by organization.
SqlFieldsQuery qry = new SqlFieldsQuery("select org.name, avg(salary), max(salary), min(salary) " +
    "from Person, ""Organizations".Organization as org " +
    "where Person.orgId = org.id " +
    "group by org.name " +
    "order by org.name");

QueryCursor<List<?>> cursor = cache.query(qry);

List<List<?>> res = cursor.getAll();
```
In-Memory Compute Grid

- Direct API for MapReduce
- Direct API for ForkJoin
- Zero Deployment
- Cron-like Task Scheduling
- State Checkpoints
- Load Balancing
- Automatic Failover
- Full Cluster Management
- Pluggable SPI Design
In-Memory Streaming and CEP

• Streaming Data Never Ends
• Branching Pipelines
• Pluggable Routing
• Sliding Windows for CEP/Continuous Query
• SQL Queries (ANSI 99)
• Query Across Sliding Windows
• Real Time Analysis
In-Memory Service Grid

• **Singletons on the Cluster**
  - Cluster Singleton
  - Node Singleton
  - Key Singleton

• **Distribute any Data Structure**
  - Available Anywhere on the Grid
  - Access Anywhere via Proxies

• **Guaranteed Availability**
  - Auto Redeployment in Case of Failures
Apache Ignite for BI and Analytics
DevOps: Integration with Yarn and Mesos

• Automatic Resource Management
• Easy Data Center Installation
• Easy Data Center Configuration
• On-Demand Elasticity
Share RDDs Across Spark Jobs

- **IgniteRDD**
  - Share RDD across jobs on the host
  - Share RDD across jobs in the application
  - Share RDD globally
- **Faster SQL**
  - In-Memory Indexes
  - SQL on top of Shared RDD
• Ignite In-Memory File System (IGFS)
  – Hadoop-compliant
  – Easy to Install
  – On-Heap and Off-Heap
  – Caching Layer for HDFS
  – Write-through and Read-through HDFS
  – Performance Boost
Ignite In-Memory Map Reduce

• In-Memory Native Performance
• Zero Code Change
• Use existing MR code
• Use existing Hive queries
• No Name Node
• No Network Noise
• In-Process Data Colocation
• Eager Push Scheduling
Interactive SQL with Apache Zeppelin
GridGain Enterprise Subscriptions include the following during the term of the subscription:

- Right to use GridGain Enterprise Edition
- Bug fixes, patches, updates and upgrades
- 9x5 or 24x7 Support
- Ability to procure Training and Consulting Services from GridGain
- Confidence and protection, not provided under Open Source licensing, that only a commercial vendor can provide, such as indemnification

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ANY QUESTIONS?

Thank you for joining us. Follow the conversation.
https://ignite.apache.org

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