

Release Notes

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In-Memory Computing Platform 6.2.1

- Security and Audit
 - Added task name or task class name for all cache `READ` events if they happen from within task execution
 - Added `READ` event in addition to `PUT` event for transform operations
 - Added transformer class name to all cache `READ` and `PUT` events if they happen within a transformer
 - Ensured that proper `READ` event is triggered for all query executions, i.e. `SCAN`, `SQL`, `TEXT`, and `Continuous queries`
- Added Spring `@Cacheable` annotation support
- Fixed license processor to calculate CPUs, hosts, etc. only for nodes with same cache distribution mode
- Fixed DR to work with portable configuration
- Additional fixes and improvements
- Visor Management and Monitoring
 - Added quick filters by message type for event logs

In-Memory Computing Platform 6.2.0

- In-Memory HPC, Data Grid, and Streaming
 - Added Portable Objects for Java - .NET - C++ interoperability.
 - Support for structural data changes without cluster restart.
 - Support for basic user object serialization across platforms (able to treat any object as portable object).
 - Automatic handling for Maps and Collections across platforms.
 - Ability to specify custom serialization logic through `GridPortableMarshalAware` interface.
 - Automatic handling of primitive types, dates, timestamps, and UUIDs across platforms.
 - Added portable type and field metadata.
 - Support for custom serializers to provide custom serialization logic without changes to portable classes.
 - Support for customer type ID and field ID mappers.
 - Ability to specify portable objects from client side with star `***` wildcard notation (e.g. `"my.portables.package.*"`).
 - Ability to specify alternate affinity key for portable objects.
 - Added Distributed Services to support cluster-aware service deployments.
 - Support for per-cluster singleton services.

- Support for per-node singleton services.
- Support for service deployment with configurable number of instances per node or per cluster.
- Support for service deployment based on cache affinity key.
- Support for automatic service deployment on startup or dynamically through API.
- Support for automatic leader election with new `forOldest()` and `forYoungest()` methods added to `GridProjection`.
- Ability to read license file from class path using `classpath:some/path` syntax.
- Made JDBC table creation optional in `GridCacheJdbcBlobStore` and `GridTcpDiscoveryJdbcIpFinder`.
- Visor Management and Monitoring
 - Added limited Visor edition for open source users.
 - Added new tab for rolling updates.
 - Added new security tab with a list of authenticated subjects and permissions.
 - Added Visor authentication for cases when security is enabled.
 - Added support for custom (pluggable) tabs in Visor.
 - Added support for executing alert scripts in addition to sending alert emails.
 - Added "Node busy time percentage" chart series.
 - Added support for "*" and "?" wildcard symbols to all table filters.
 - Added Visor connectivity through SSH tunnel.
- In-Memory Hadoop Accelerator
 - Added support for Apache Hadoop 2 compatible In-Memory Map-Reduce.
 - Changed GGFS URI structure.
 - Implemented in-process Hadoop file system wrapper for GGFS.
 - Removed support for Apache Hadoop 1.
 - Implemented command line setup tool for Apache Hadoop client configuration.

In-Memory Computing Platform 6.1.9

- Fixed problems with `gridgain-jta.jar`
- Visor management and monitoring
 - Fixed dependency list

In-Memory Computing Platform 6.1.8

- Project modularization and dependency cleanup
- Other bug fixes and enhancements
- Not backward compatible with GridGain Enterprise 6.1.5 and 6.1.6 (all releases before and after are OK).
- Visor management and monitoring
 - File Manager: added ability to search in subfolders
 - Updated scala libs from 2.10.3 to 2.10.4 version
 - Other bug fixes and enhancements

In-Memory Computing Platform 6.1.7

- Added client authenticated subject cache shared across nodes.
- Added authenticated subject ID to Cache and Task events.

In-Memory Computing Platform 6.1.6

- Fixed MVCC locking for REPLICATED cache
- Added socket buffer size adjustment for better performance in TCP communication
- Fixed NPE for NEAR_ONLY caches when deployed with PARTITIONED_ONLY servers

In-Memory Computing Platform 6.1.5

- Added `java.util.Set` implementation to distributed cache datastructures
- Added support for synchronous evicts in replicated cache
- Added `GridCacheInterceptor` for intercepting and modifying cache operations
- Added `GridSecurity` facade
- Added authorization for main cache and task operations
- Significant performance improvements to remote clients
- Other bug fixes and enhancements
- Visor management and monitoring
 - Added support for search and replace in configuration and Sql editors.
 - Sql Viewer Tab: added possibility to change query "Page Size" (number of rows to fetch at once) at any moment
 - Extended filters for charts on Datagrid Tab (added filtering by caches), GGFS Tab (added filtering by nodes), Streaming Tab (added filtering by streamers)

- Other bug fixes and enhancements

In-Memory Computing Platform 6.1.1

- Enhancements for JDK8 lambdas support
- Enhancements and bug fixes for rendezvous affinity function

In-Memory Computing Platform 6.1.0

- Added support for distributed execution of JDK8 lambdas
- Added support for rendezvous affinity function and "fair" affinity function for better partition distribution between data nodes
- Added support for geospatial indexes in data grid queries
- Significant performance improvements in distributed queue implementation
- Fixed problem with multicast IP finder in some environments
- Enhanced events API
- Other bug fixes and enhancements
- Visor management and monitoring
 - Enhanced data center replication UI
 - Other bug fixes and enhancements

In-Memory Computing Platform 6.0.3

- Added support for atomic mode for distributed cache with near cache enabled
- Added support for atomic mode for local cache
- Datacenter replication: improvements and bug fixes and documentation improvements
- REST configuration made optional
- Other bug fixes and enhancements
- Visor Management and monitoring
 - Fixed issues when more than 1 Visor are connected to the grid
 - Other bug fixes and enhancements

In-Memory Computing Platform 6.0.2

- Simplified configuration
- Simplified documentation
- Migrated to Maven Central
- Performance improvements for continuous queries
- Other bug fixes and enhancements
- Visor Management & Monitoring
 - Improvements to datacenter replication tab
 - Added ability to view existing indexes
 - Added ability to scan cache contents even with indexes disabled (supported in command line visor as well)

In-Memory Computing Platform 6.0.1

- Removed all deprecated code
- Added Bi-directional WAN Datacenter Replication across different geographies
- Added local restartable store for disk-based recovery in case of large cluster failures
- Added ATOMIC mode for REPLICATED cache
- Added Near cache and Client-only mode to REPLICATED cache
- Added Hibernate L2 cache out-of-the-box integration
- Added GridLifecycleAware callbacks to all configurable grid components
- Significant performance improvements to network I/O
- Significant performance improvements to C++ client
- Significantly simplified all examples and migrated them to Maven for easier integration with IDEs
- API changes (not backward compatible)
 - Refactored GridProjection into following components and significantly simplified APIs
 - GridProjection - clustering and logical grid node grouping
 - GridCompute - distributed computations on the grid
 - GridMessaging - topic-based message exchange functionality
 - GridEvents - distributed event notifications
 - GridScheduler - cron-based scheduling functionality
 - GridProduct - product information and licensing functionality
 - Refactored GridCacheProjection into following components and significantly simplified APIs
 - GridCacheProjection - data manipulation, transactions, and locking functionality

- GridCacheAffinity - data partitioning and key-to-node mapping functionality
- GridCacheQueries - SQL, scan, and full text search queries
- GridCacheDataStructures - various grid-aware data structures similar in APIs to `java.util.concurrent` package
- Removed GridFunc and significantly simplified `org.gridgain.grid.lang` package
- Removed `typedef` package and replaced all class aliases with class names
- Various other fixes and performance improvements
- Visor Management & Monitoring
 - New tabs for datacenter replication send and receive counterparts
 - Added SQL syntax highlighting to SQL Queries tab
 - Performance improvements to command-line Visor (moved it off of Scala REPL)

In-Memory Data Grid 5.3.3

- Fixed slow memory leak in query execution.
- Fixed slow memory leak in the lock methods in cache projection with predicate.

In-Memory HPC/Data Grid 5.3.1, Streaming 2.1.1, Hadoop Accelerator 2.1.1

- Rolling updates feature in this release is not compatible with previous releases due to significant enhancements to messaging protocol.
- Added auto-unsubscribe of continuous queries and continuous event notifications if requester node leaves grid.
- Added binding to all network interfaces on startup if local host is not explicitly specified.
- Visor Management New Features and Enhancements
 - Added ability to open multiple node tabs at once.
 - Added ability to view files directly from GGFS File Manger either using system viewer or internal visor viewer.
 - Added execution plan option to SQL Viewer tab.

In-Memory HPC/Data Grid 5.3.0

- Fixed issues related to memory consumption.
- Added eager cache entry expiration based on time-to-live.
- Cleaned up examples structure.
- Enhancements and bug fixes.

Streaming 2.1.1, Hadoop Accelerator 2.1.1

- Enhancements and bug fixes.

In-Memory HPC/Data Grid 5.2.2, Streaming 2.0.2, Hadoop Accelerator 2.0.2

- Added support for Web Session caching, automatic web session fault tolerance, load balancing, and expiration.
- Added magic bytes to discovery messages to make sure that other applications would not be send messages to GridGain.
- Added automatic back-pressure for FULL_ASYNC write synchronization mode to avoid possible out-of-memory condition under load.
- Added API and performance optimizations for synchronous query execution.
- Other bug fixes and enhancements.
- Visor Management New Features and Enhancements
 - Added Visor remote connectivity support. Now you can use Visor to monitor remote grids without having to become a grid member. For example, you can have your grid running on a public cloud and start Visor Console on your local laptop.
 - Fixed issue when CPU was greater than 100% on charts.

In-Memory HPC/Data Grid 5.2.1, Streaming 2.0.1, Hadoop Accelerator 2.0.1

- Fixed backward version compatibility issue

In-Memory HPC/Data Grid 5.2.0 Release Notes

- Fixed slow memory leak in query execution.
- Fixed slow memory leak in the lock methods in cache projection with predicate.

- Added Multicast-based IP Finder to GridTcpDiscoverySpi.
- Added backward compatibility support to allow different versions of GridGain run in the same cluster.
- Added rich performance suggestions on startup.
- Implemented PRIMARY_SYNC mode for partitioned transactional cache.
- Significantly reduced size of cache entry.
- Changed node consistent hash ID from node ID to `ip:port` combination to ensure that node remains in same consistent hash position upon restart.
- Deprecated evictionEnabled flag.
- Implemented optional asynchronous message sending based on NIO functionality (in addition to existing NIO-based message receiving).
- Implemented clock-versioning in distributed caches to speed up FULL_SYNC mode.
- Removed serialization of values put in cache or off-heap when value is of primitive byte-array type.
- Significantly improved error messages and usability suggestions.
- Added performance suggestions for non-optimal configurations.
- Numerous enhancements and bug fixes.

In-Memory Streaming 2.0 Release Notes

- Added Hash-based and Tree-based indexes for rolling windows.
- Numerous enhancements and bug fixes.

In-Memory Accelerator for Hadoop® 2.0 Release Notes

- Added MapReduce over GGFS functionality.
- Numerous enhancements and bug fixes.

In-Memory HPC/Data Grid 5.1.6 Release Notes

- Added CLIENT_ONLY mode for partitioned cache.
- Added ATOMIC atomicity mode which provides better performance for non-transactional use cases.
- Added optional GridOptimizedMarshallable interface to help optimized marshaller remove internal lookups.
- Added one-phase commit in TRANSACTIONAL mode for basic put and putAll operations.
- Added automatic back-pressure control for async operations.
- Multiple fixes/enhancements to Visor Management Console

In-Memory Accelerator for MongoDB® 1.0b Release Notes

- Available in GridGain Maven Repository.
- Support for all MongoDB commands except for aggregation framework.
- Support for automatic repartitioning.
- Provided benchmarks to compare performance with native MongoDB.
- Visor Management New Features and Enhancements
 - New Visor MongoDB tab for management and monitoring of Mongo databases and collections stored in GridGain.

In-Memory Accelerator for Hadoop® 1.2 Release Notes

- Available in GridGain Maven Repository.
- Visor Management New Features and Enhancements
 - Improved time accuracy in Profiler tab to nanoseconds.
 - Default folders for every operational mode are optionally created upon GGFS (re)format.
 - Ability to turn logging on and off when profiler starts and stops.

In-Memory Streaming 1.1 Release Notes

- Available in GridGain Maven Repository.
- Minor bug fixes.
- Visor Management New Features and Enhancements
 - Added query metrics to Streaming tab.

In-Memory HPC/Data Grid 5.1.2 Release Notes

- Available in GridGain Maven repository
- Added direct client-to-node connectivity mode for remote clients.
- Added type-based filtering to `Continuous Query` functionality.
- Added `AutoCloseable` to all main grid APIs.
- Added `GridCacheCountDownLatchExample`.
- Visor Management New Features and Enhancements
 - Fixed partition ID formatting in Database tab.

In-Memory Accelerator for Hadoop® 1.0 Release Notes

- Available in GridGain Maven repository.
- New Features and Enhancements
 - Added support for Hadoop 2.0 in addition to Hadoop 1.0.
 - Added `DUAL_ASYNC` mode to allow asynchronous writes to HDFS.
 - Added asynchronous delete in GGFS.
 - Added formatting function to GGFS.
 - Added additional metrics to GGFS.
- Visor Management New Features and Enhancements
 - Added hot-key support to File Manager tab.
 - Added enhanced search capabilities to File Manager tab.
 - Added Profiler tab to profile GGFS and HDFS performance and identify hotspots on the fly
 - Ability to profile various read and write metrics.
 - Access uniformity to control which sections of the file get accessed the most.
 - Ability to take profiling snapshots.
 - Ability to clear and reset profiler data.
 - Ability to filter based on GGFS mode as well as file names.

In-Memory Streaming 1.0b (Beta) Release Notes

- Available in GridGain Maven repository.
- New Features and Enhancements
 - Direct support for Complex Event Processing (CEP).
 - Pluggable rolling event windows
 - Support for batch windows.
 - Support for unique and sorted windows.
 - Support for bounded and unbounded windows.
 - Pluggable routing.
 - Affinity event collocation with GridGain in-memory data grid nodes.
 - Branching pipelines.
- Visor Management New Features and Enhancements
 - New Streaming tab to manage and monitor all deployed streamers including.

In-Memory HPC/Data Grid 5.1 Release Notes

- Available in GridGain Maven repository
- New Features And Enhancements
 - New continuous querying capability.
 - New continuous remote event notification capability.
 - Implemented efficient IPC communication between multiple nodes started on the same host.
 - Added off-heap metrics to `GridCacheProjection`.
 - Added examples for direct GGFS API usage.
 - Added `EVT_CACHE_PRELOAD_OBJECT_LOADED` and `EVT_CACHE_PRELOAD_OBJECT_UNLOADED` to notify listeners if an object got pre-loaded or unloaded by the system.
- Visor Management New Features and Enhancements
 - Many convenience and usability enhancements to UI.
- Core Bug Fixes

- Deprecated `GridJobAdapterEx` in favor of `GridJobAdapter` and `GridJobContinuationAdapter`.
- Fixed `NotSerializableException` in `GridOptimizedMarshaller` in JDK7.
- Multiple bug fixes for IPC communication.

Gridgain 5.0 Release Notes

- New Features And Enhancements
 - New off-heap memory mode allowing to cache all keys on-heap and all values off-heap.
 - New `GridFileSwapSpaceSpi` which caches all keys in-memory and keeps all values on local file system.
 - GGFS - GridGain distributed in-memory file system.
 - `GridGgfsHadoopFileSystem` - Hadoop `FileSystem` adapter for GGFS to be used together with or instead of HDFS or any other Hadoop file system.
 - Support of automatic read-through and write-through to and from HDFS or any other Hadoop file system.
 - Support for high-throughput IPC over shared memory on Linux.
 - Series of GGFS vs. HDFS benchmarks to demonstrates performance differences.
 - Improved IO and thread context switching to achieve significant performance improvements for high-throughput messaging and job execution.
- Visor Management New Features and Enhancements
 - New GGFS tab to manage and monitor various GGFS properties.
 - New `FileManager` tab to provide various file system operation within the same file system and across different file systems.
- Core Bug Fixes
 - Fixed handling of spaces in Windows `.bat` scripts.

GridGain 4.5.0 Release Notes

- New Features And Enhancements
 - `HyperLocking` to minimize locking and serialization overhead for cache transactions under load.
 - `Risk Analytics` benchmark.
 - Custom SQL Functions including `GridCacheQueryCustomFunctionExample` to show how to use them.
 - Full off-heap indexing to `GridH2IndexingSpi`.
 - Execution plan printout for long queries by setting `GridH2IndexingSpi.setLongQueryExplain(true)` parameter.
 - Topic-based user message exchange.
 - `GridNoopCheckpointSpi` to remove checkpoint overhead whenever checkpoints are not used.
 - `GridNoopSwapSpaceSpi` to remove swap space overhead whenever it is not used.
- Visor Management New Features and Enhancements
 - Added `telemetry` screen in Visor to show overall grid status based on various metrics.
 - Added dedicated `cache` tab to show all cache-specific information.
- Core Bug Fixes
 - Path space issues in `ggstart.bat` startup script.
 - Deadlock with concurrent `evictAll()` and `unswapAll()`.
 - Query iterators are removed but not closed when originating node leaves or fails.
 - Restructured all examples to make them easier to use and understand.
- Client Connectivity Bug Fixes
 - Removed `ADD` method from client API as it was identical to `putIfAbsent` method.
- Visor Management Bug Fixes
 - Visor graph tooltip does not show whole information.
 - Visor spits errors (failed to fetch model update) when new node joins and busy with data pre-loading.

GridGain 4.3.1 Release Notes

- New Features and Enhancements
 - Added remove operation to data loader.
 - Significantly improved performance of partition to node mapping.
 - Added `GridSerializationBenchmark` for comparing performance of Java, Kryo, and GridGain serialization.
 - Added property-based configuration to remote clients.
 - Optimized concurrency for asynchronous methods in C++ client.
- Core Bug Fixes

- Unmarshalling of `SimpleDateFormat` fails with NPE.
- Possible NPE in Indexing Manager when using distributed data structures.
- Swap partition iterator skips entries if off-heap iterator is empty.
- `GridDataLoader` does not allow to cache primitive arrays.
- Excessive memory consumption in indexing SPI.
- Add check on startup that `GridOptimizedMarshaller` is supported by running JDK version.
- If ordered message is timed out, other messages for the same topic may not be processed.
- `ScalarPiCalculationExample` does not provide correct estimate for PI.
- Client Connectivity Bug Fixes
 - Client router with explicit default configuration leads to NPE.
 - Repair REST client support to make session token and client ID optional.
 - Ping does not work properly in C++ client.
- Visor Management Bug Fixes
 - Clear and Compact operations in Visor do not account for node selection.
 - Move Visor management tasks into a separate thread pool.
 - Preload dialog in Visor does not show correct number of keys.
 - GC dialog in Visor waits indefinitely for dead nodes.
 - Increase tooltip dismiss time in Visor.
 - Visor log search does not show nodes table correctly on Windows.

GridGain 4.x Release Notes

- In-Memory Data Grid / Distributed Cache.
- Off-Heap BigMemory Storage to avoid lengthy GC pauses when using large amounts of memory.
- Indexing SPI for pluggable highly concurrent in-memory indexing.
- Data Loader for efficient bulk-load operations on cache.
- Distributed data structures
 - Distributed Atomic Sequence.
 - Distributed Atomic Long.
 - Distributed Stamped Reference.
 - Distributed Count Down Latch.
 - Distributed bounded and unbounded queues.
- Near-only cache (enabling cache operations without participating in caching).
- Partition-only cache.
- Significant optimizations for Collocated cache operations.
- Delayed and manual repartitioning to avoid excessive network traffic on topology changes.
- Write-behind caching.
- Synchronized cache evictions with other cache nodes.
- Distributed cache garbage collector to monitor/remove stale locks.
- Significantly reduced cache memory consumption.
- Compute Grid
 - Significant optimizations on all levels utilizing concurrent data structures.
 - Distributed Continuations and Recursive Split.
- Remote Client Connectivity
 - Affinity-aware Java Remote Client.
 - Affinity-aware .NET Remote Client.
 - Affinity-aware C++ Remote Client.
 - REST-based HTTP Remote Client.
 - Affinity Aware Router/Gateway for remote client connectivity.
 - JAAS-based authentication of remote clients.
 - Secure communication protocol for establishing secure channels between remote clients and grid nodes
 - RememberMe secure session SPI.
 - Clustering / Networking
 - Pluggable Network Segmentation Policies to handle Split-Brain Network Segmentation
 - Basic reachability segmentation resolver.
 - Shared file system segmentation resolver.
 - TCP connection segmentation resolver.
 - Support for authentication of cluster nodes
 - JAAS-based authentication SPI.
 - Passcode-based authentication SPI.

- Marshalling
 - Optimized Marshalling achieving 20x faster serialization than standard Java serialization.
- Management And Monitoring.
- Visual GUI-based Visor Management And Monitoring
 - Dashboard Tab
 - View CPU and Heap Charts.
 - View grid topology and metrics for all grid nodes.
 - Start/stop/restart any number of remote nodes.
 - Dynamically view/update license at runtime.
 - Integration with VisualVM for automatic JVM profiling of remote nodes.
 - Visual thread dump of any grid node.
 - View and search logs from any of the nodes.
 - View Grid events.
 - Group Tab
 - Provides functionality identical to Dashboard for any subgroup of the nodes.
 - Host Tab
 - Provides functionality identical to Dashboard for all nodes started on a specific host.
 - Node Tab
 - Provides functionality identical to Dashboard for a specific node.
 - Various views of metrics, configuration, and system or environment properties for given node.
 - In-Memory HPC Tab
 - View various charts for currently executing and waiting jobs.
 - View tasks executions including split information and nodes assignments.
 - Ability to map tasks and jobs to nodes and vise versa.
 - In-Memory Data Grid Tab
 - View various charts regarding cache hits/misses/reads/writes/commits/rollbacks.
 - View statistical information about all caches defined.
 - Ability to map from caches to nodes and from nodes to caches.
 - Execute various management commands such as *compact*, *clear*, *swap*, *preload*, *load*, etc...
 - Object Browser Tab
 - View metadata/schema of all cached deployed in the grid.
 - Run SQL queries on any of the nodes and caches using built-in SQL viewer.

GridGain 3.x Release Notes

- In-Memory Data Grid
 - Distributed in-memory key-value store.
 - Local / Replicated / Partitioned caches.
 - Full support for ACID transactions
 - Optimistic / Pessimistic transactions.
 - Read-Committed / Repeatable-Read / Serializable isolation levels.
 - JTA / JCA Integration.
 - Disk-based Swap overflow storage
 - LevelDB swap storage SPI.
 - Pluggable eviction policies
 - LRU
 - FIFO
 - Random
 - Time-based
 - MVCC-based concurrency.
 - Synchronous and Asynchronous cache operations.
 - Replication and Invalidation modes.
 - Read-Through and Write-Through behavior for pluggable GridCacheStore.
 - Pluggable data partitioning.
 - SQL Queries for in-memory data
 - Affinity-based collocated queries.
 - Predicate-based full-scan queries.
 - Remote query transformations.
 - Local and Remote query result reduction.
 - Lucene-based text queries.

- H2-based Data Indexing for SQL queries.
- OOP and FP-based APIs for Java and Scala.
- Automatic support for object cloning.
- Compute Grid
 - Distributed cache as checkpoint storage.
 - Affinity routing for partitioned in-memory data grid.
 - GridNodeLocal cache for storing shared state between jobs.
 - Distributed continuations for suspending/resuming job execution.
 - Cron-based scheduling.
- Clustering / Networking
 - TCP-based Discovery SPI.
 - Pluggable IP-Finders.
 - In-VM IP Finder
 - Amazon S3 IP Finder
 - Shared-FS IP Finder
 - Support for 1000+ node topologies.
- Management And Monitoring
 - Shell-based Visor Management And Monitoring.
 - Support for various grid topology and configuration commands.
 - Support for custom user-defined management commands.
 - JMX-based Management and Monitoring.

GridGain 2.x (and earlier) Release Notes

- Compute Grid
 - In-Memory MapReduce.
 - Pluggable failover
 - Job-stealing failover SPI.
 - Pluggable topology
 - Basic topology SPI.
 - Node-attributes topology SPI.
 - Node-filter topology SPI.
 - Pluggable collision resolution
 - Fifo-queue collision resolution SPI.
 - Priority collision resolution SPI.
 - Job stealing collision resolution SPI.
 - Pluggable job checkpointing
 - JDBC-based checkpoint SPI.
 - Shared file system checkpoint SPI.
 - Amazon S3 checkpoint SPI.
 - Pluggable load balancing
 - Round-robin load balancing SPI.
 - Weighted-random load balancing SPI.
 - Adaptive load balancing SPI.
 - Pluggable event storage
 - In-memory event storage SPI.
 - Pluggable node discovery
 - Multicast-based node discovery SPI.
 - Job Stealing for keeping all nodes equally loaded.
 - Distributed task session.
 - AOP-based job execution.
 - Support for redundant job mapping.
 - Support for partial reduction.
 - Zero deployment and Peer Class Loading.
 - SPI-based architecture.
 - GridGain loaders for automatic blending into any environment (e.g. app servers, web servers, embedded, stand alone, etc...).