



Learn How Retail Banking Goes Digital with In-Memory Computing

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Gartner 2014
CoolVendor



Retail Banking Is Changing

- Reduced barriers of entry
- Lower transaction costs
- Decreasing profit margins
- Increased competition from traditional and non-traditional players
- Instant product customization
- Issues with customer retention
- Innovative ideas with shortened cycles
- Transition from “branch” model to “omnichannel model”

“55% of bank executives view non-traditional new players as a threat, while 31% believe they present innovative partnership opportunities” – PWC Retail Banking 2020: Evolution or Revolution” Report

Current Industry Trends

Digital Customer Experience

- 24/7
- Digital branches
- Smart ATMs
- Mobile apps
- On-line services
- Harmonious experience across channels
- Social media hookups
- Interactive tools
- Innovation labs
- Breaking down product silos
- Customer rewarding

Regulatory oversight

- Capital planning and stress testing
- Enhanced hedging, governance and risk management
- Operational changes
- Privacy of customer's data
- Consumer protection
- KYC/AML/Fraud
- Cyber risk

Technology

- Digital innovation
- Data dependency
- Mobility
- Real time
- Security

Regulatory Changes

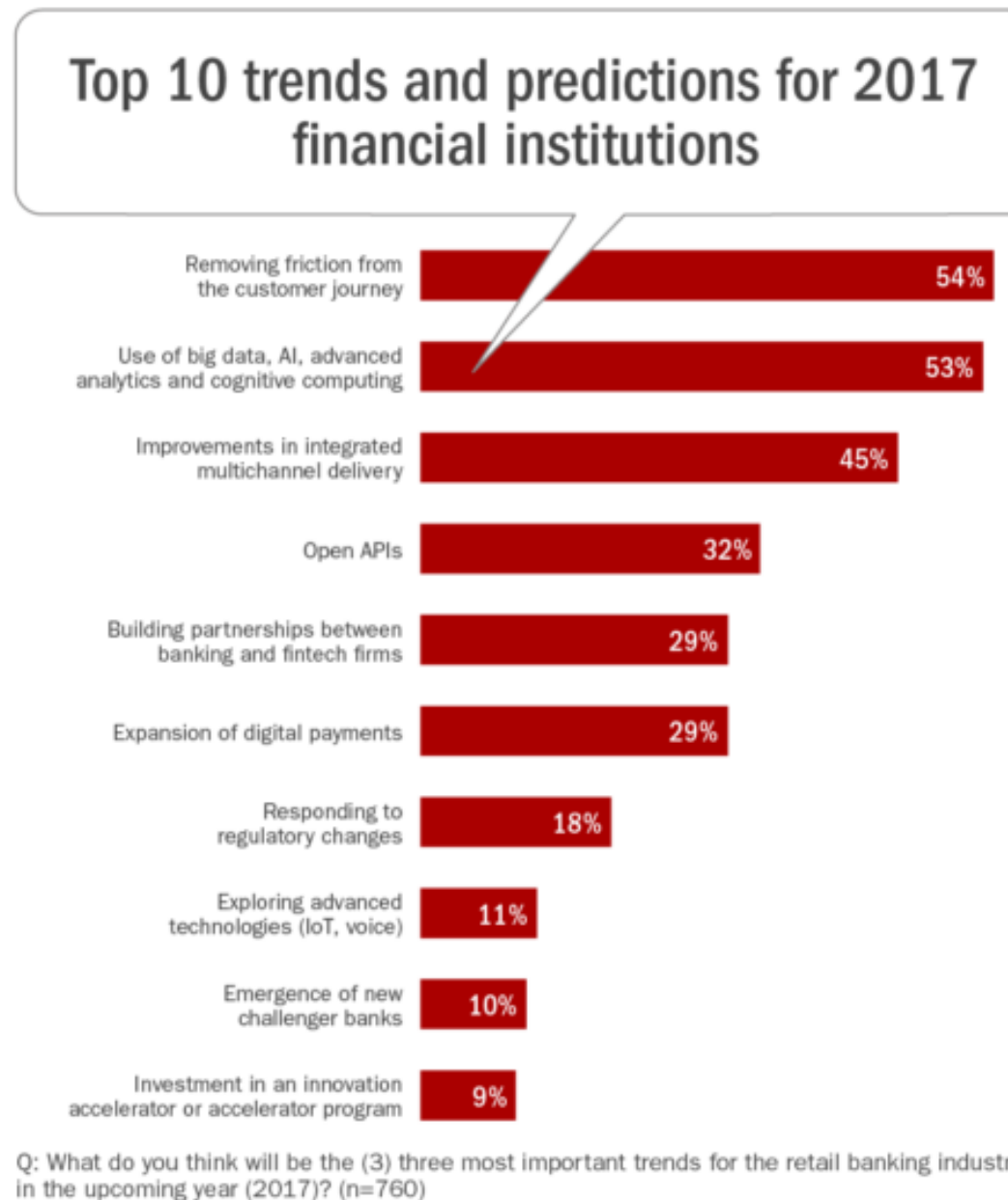
- US Elections
- Dodd-Frank
- FATCA
- MiFID
- Market Abuse Directive
- Payment Services Directive (PSD2)
- Solvency
- Comprehensive Capital Analysis and Review (CCAR)
- Data Governance
- Transparency and Reporting
- Consumer Financial Protection Bureau (CFPB)
- KYC and AML
- USA Patriot Act
- Financial Privacy Act (Regulation P)
- Tax Information Exchange Agreements
- NYS Department of Financial Services Cybersecurity Program

Technology Trends

- Blockchains in retail banking
- Big Data
- Cloud services
- Social media
- Integrated digital experience
- Mobile technology
- Internet of Things and Internet of Everything
- Cybersecurity
- Eliminating data silos
- Digital and blended authentication
- Open source and open architecture
- In-Memory computing
- Lower cost

FinTech Collaboration

“When we surveyed close to 100 global financial services influencers, the most mentioned trend was the future partnership of traditional financial services organizations and Fintech firms” — *Accenture Consulting Report on Digital Banking Trends for 2016 with Jim Marous*



Source: DBR Research © December 2016 The Financial Brand

Evolution of In-Memory Grid Computing

- Move from Disk to 100% In-Memory (RAM)
- Leverage Clustered Memory and Parallel Distributed Processing
- Results: 1000x Faster, 10x ROI Improvement
- Making “Big Data” Fast

“In-memory will have an industry impact comparable to web and cloud.”

“RAM is the new disk, and disk is the new tape.”

Gartner

In-Memory Computing Market:

- \$10B in 2019
- CAGR 22%

Gartner

Financial Customer Use Cases

Data Velocity, Data Volume, Data Consistency, Real-Time Performance and Analysis

- **Core Banking and Trading Platforms**
Treasury systems, payment hubs, order management systems, algorithmic trading, high volume transactions, ultra low latencies.
- **Risk Management**
Modeling, financial engineering, pricing, hedging, what-if analysis, reporting.
- **Financial Analytics**
Real time analysis of trading positions, trending, market data analysis, sentiment analysis, complex event processing, hedging, transaction cost analysis, time series, volatility analysis, Monte Carlo simulations, Black-Scholes, derivatives pricing.
- **Big Data Analytics**
Customer and counter party 360 view, master data management, securities masters, reference data, real-time analysis of P&L, up-to-the-second operational BI.
- **Compliance and Monitoring**
Fraud, AML, KYC, market manipulation and abuse, pre and post trade compliance modeling.
- **Financial SaaS Platforms**
High performance next-generation architectures for Software as a Service Application vendors.



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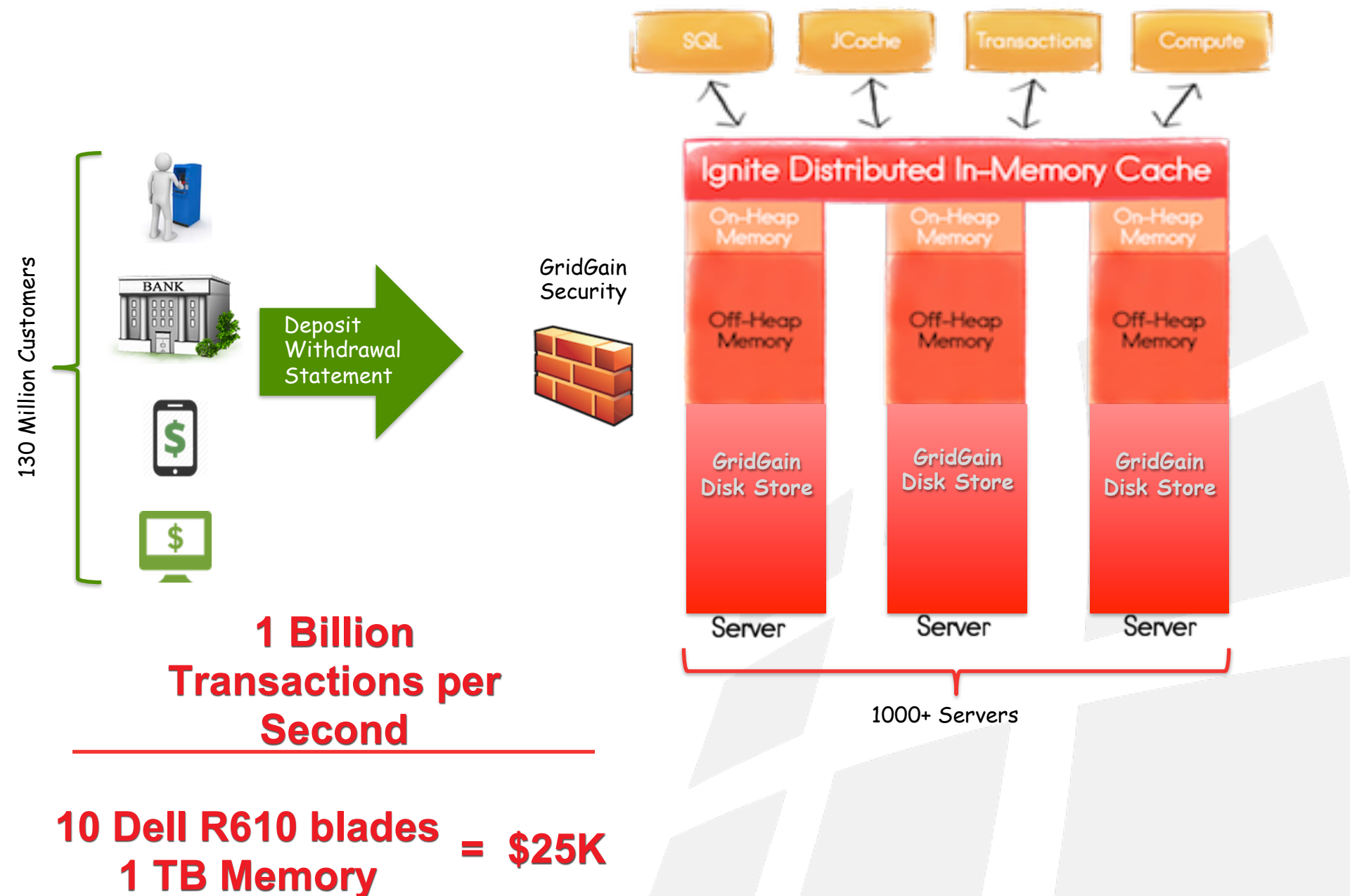


Use Case:



Largest bank in Russia and Eastern Europe, and the third largest in Europe

- Sberbank Requirements
 - Expect significant transactional volume growth
 - Migrate to data grid architecture to build next generation platform
 - Minimize dependency on Oracle
 - Move to open source
- Why GridGain Won
 - Best performance
 - 10+ competitors evaluated
 - Demonstrated best
 - Fault tolerance & scalability
 - ANSI-99 SQL Support
 - Transactional consistency
 - Strict SLAs
 - Less than 5 min cluster restart (regulatory requirement)
 - Fully Operational from disk & memory
 - Compliance with personal data law and cyber-security regulations



From RBC article – January, 2016



Herman Gref
CEO & Chairman, Sberbank

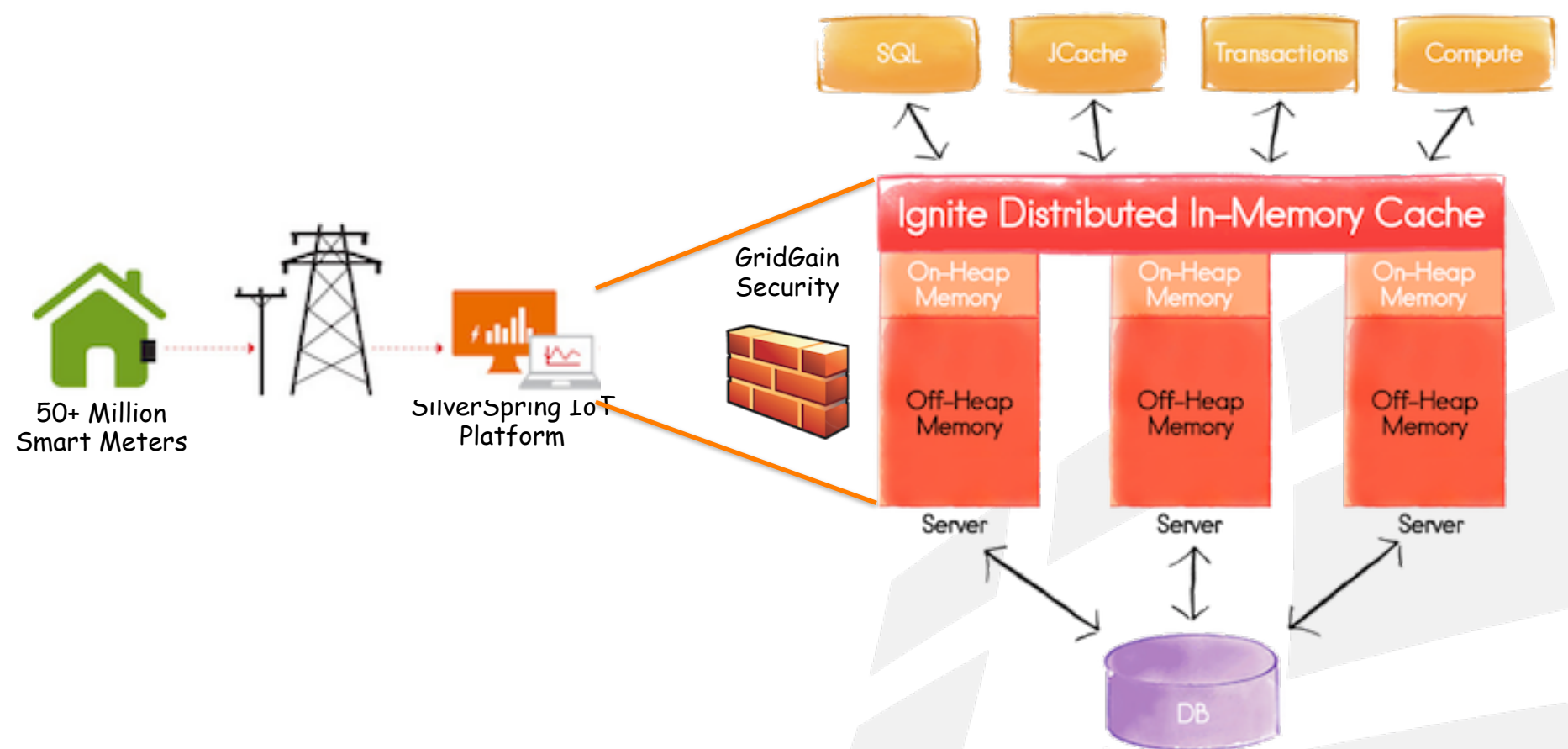
“The new Sberbank IT plan is to create a platform that enables the bank to introduce new products in hours, not weeks. The platform will have virtually unlimited performance and very high reliability. It will be much cheaper and will significantly reduce human interaction during customer transactions. The system will use machine-learning, flexible pricing, and artificial intelligence,” said Herman Gref, head of Sberbank.

“The new system will use technology from GridGain, which won the tender from Oracle, IBM and others, and turned out to deliver an order of magnitude higher performance than those of the largest companies,” he added.

Use Case:

Smart Metering and Utilities – delivers a comprehensive IOT platform

- SilverSpring Requirements
 - Migrate to in-memory processing
 - Add scalability & elasticity
 - Use open source technologies
- Why GridGain Won
 - Strong compute capabilities
 - Co-located in-memory processing
 - Demonstrated best
 - On-demand elasticity & scalability
 - ANSI-99 SQL Support
 - Transactional consistency

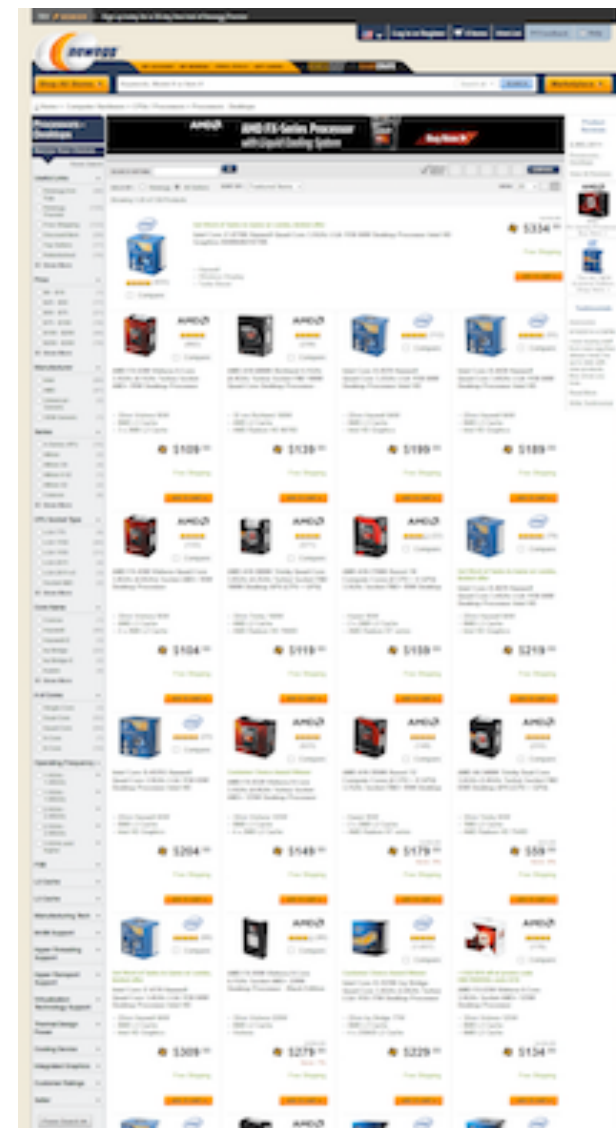


Use Case:

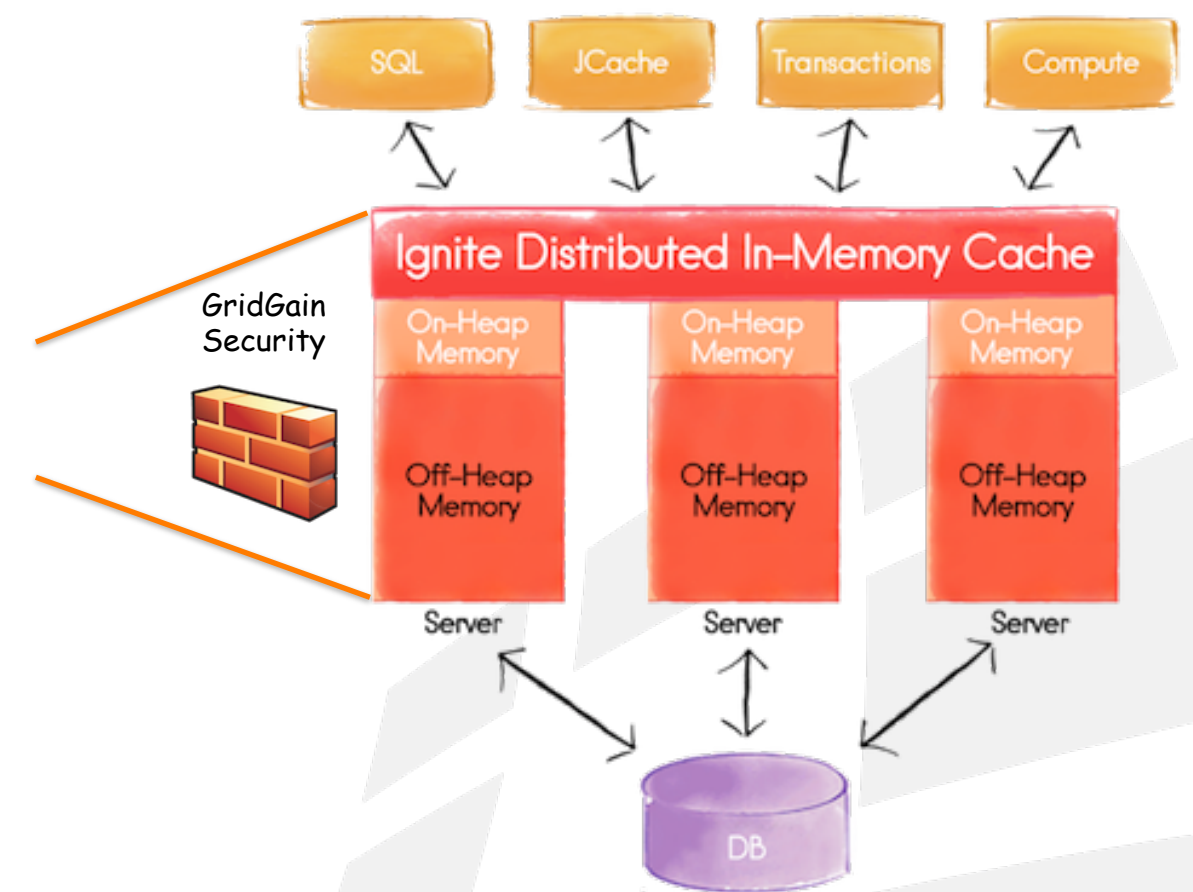


Online consumer electronics store – 11th largest retailer in US

- Newegg Requirements
 - Oracle Coherence replacement
 - Smart in-memory analytics
 - Use open source technologies
- Why GridGain Won
 - Best performance
 - 2x better than incumbent
 - Demonstrated best
 - ANSI-99 SQL Support
 - Resiliency & fault tolerance
 - Transactional consistency

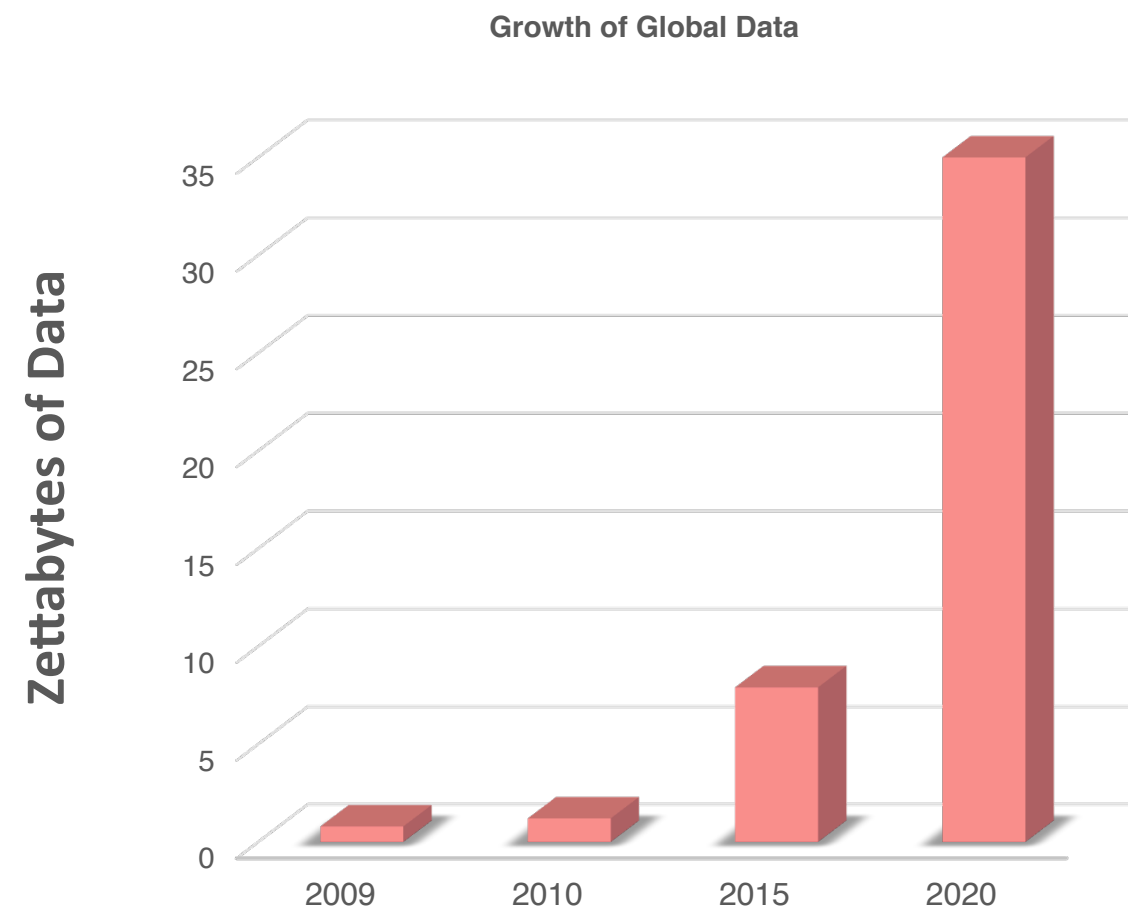


NewEgg Ecommerce Site



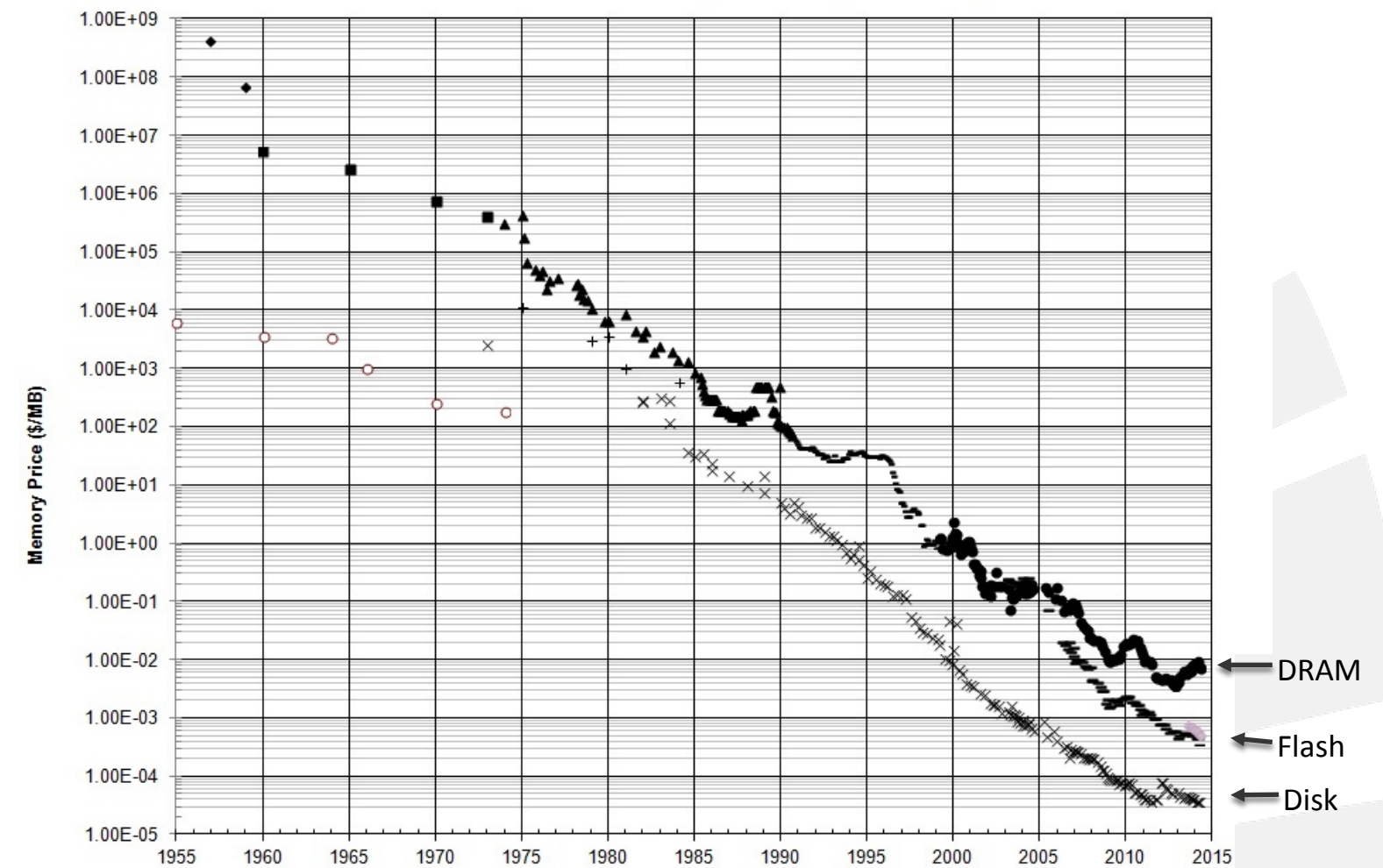
Why Now?

Data Growth and Internet Scale Driving Demand



8 zettabytes in 2015 growing to 35 in 2020

Declining DRAM Cost Driving Attractive Economics



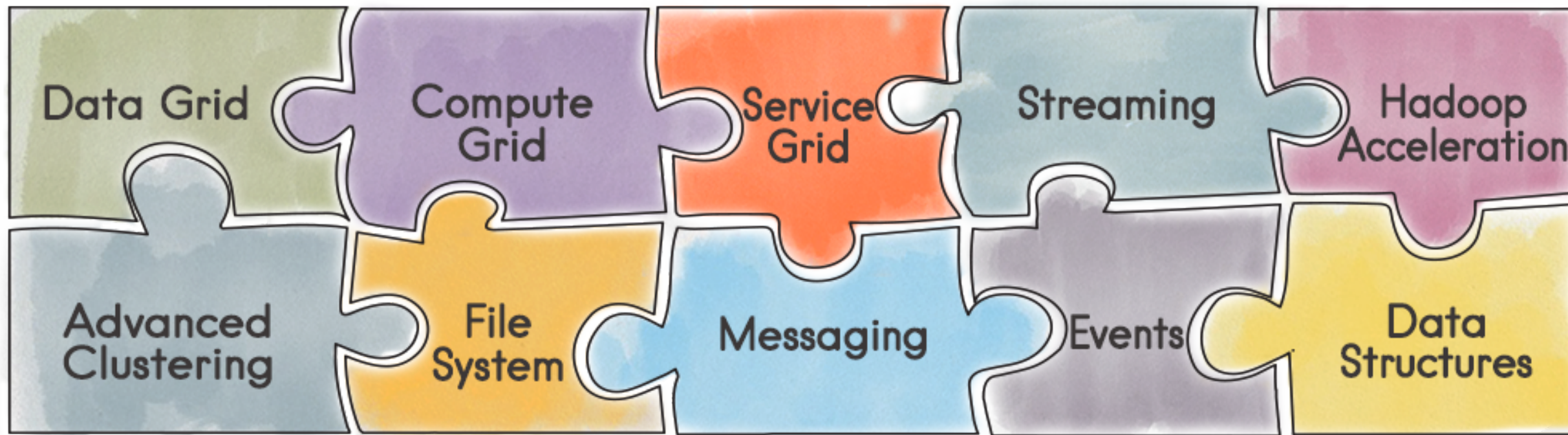
Cost drops 30% every 12 months

GridGain Enterprise and Open Source Strategy



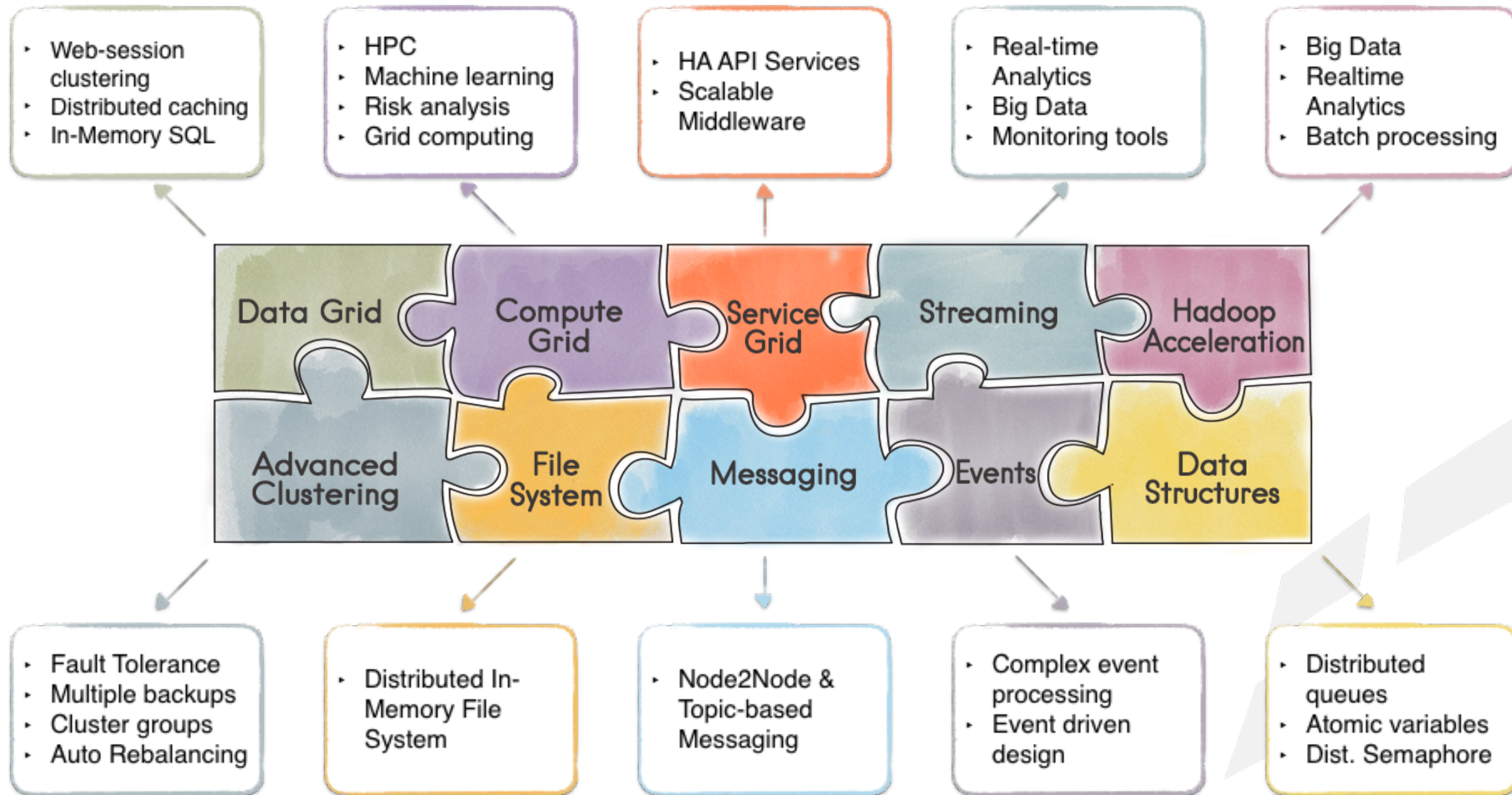
- GridGain Enterprise Edition is based on Apache Ignite
- Open source is intended to provide an easy entry point for learning, testing and non-critical use
- Enterprise Edition customers benefit from many exclusive enterprise-class features along with support and indemnification

What is an In-Memory Data Fabric?

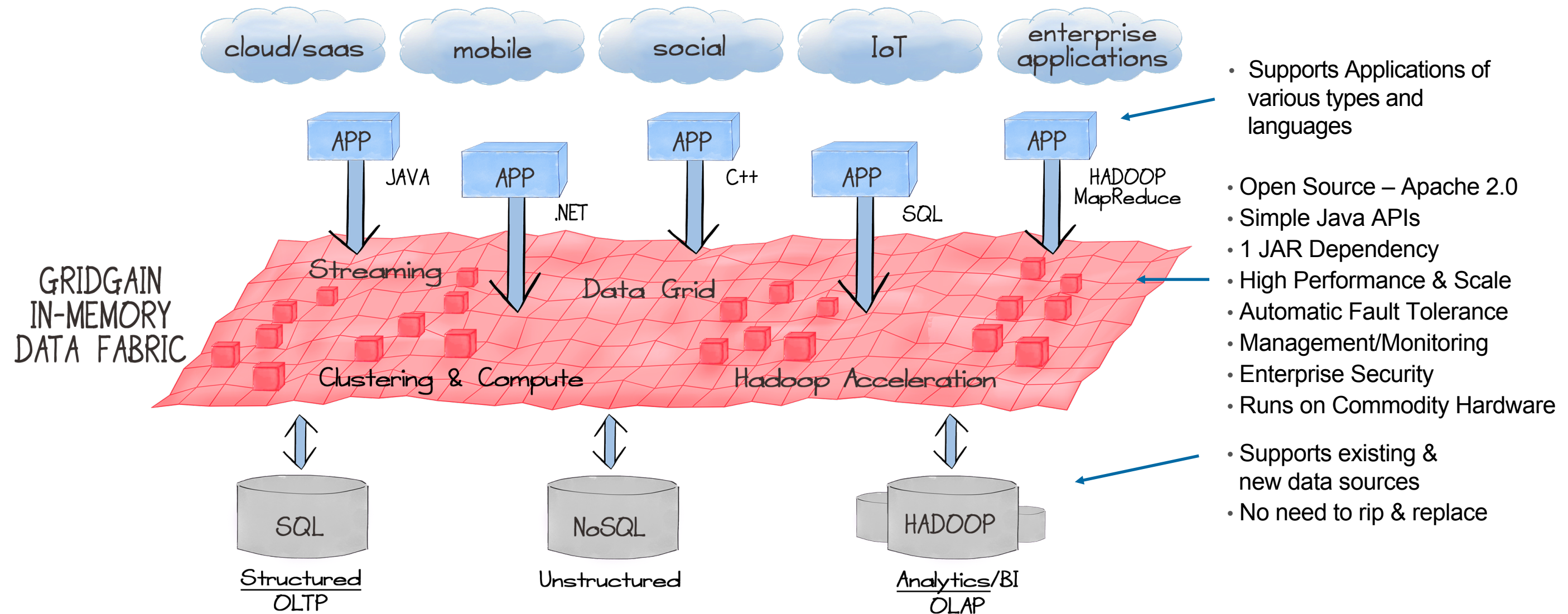


High-performance distributed in-memory platform for computing and transacting on large-scale data sets in near real-time.

In-Memory Data Fabric Use Cases



Flexibility and Enterprise Breadth of In-Memory Data Fabric



In-Memory Data Fabric: Main Benefits

- Performance

- High Throughput
- Low Latency
- Load Balancing
- Caching
- In-Memory Indexing
- Eliminate Java Garbage Collection Pauses



- Scalability

- Add Cluster Members (cores)
- Unlimited Vertical Scale
- Add Memory (RAM)

- High Availability

- Data Backups
- Datacenter Replication
- Automatic Failover
- Persistence
- Fault Tolerance
- Fast Recovery



- Transactions

- Fully ACID Compliant
- Optimistic & Pessimistic
- Data Streaming



- Persistence

- SQL, NoSQL, Hadoop
- Tiered Memory: On-Heap ->

- Security

- Auth & Auth
- Encryption
- Tracing & Auditing
- Cyber-security
- Data privacy



GridGain's In-Memory Data Fabric Enterprise Edition

GridGain Enterprise Subscriptions include:

- > Right to use GridGain Enterprise Edition
- > Bug fixes, patches, updates and upgrades
- > 9x5 or 24x7 Support
- > Training and Consulting Services from GridGain

Features	Apache Ignite	GridGain Enterprise
In-Memory Data Grid	✓	✓
In-Memory Compute Grid	✓	✓
In-Memory Service Grid	✓	✓
In-Memory Streaming	✓	✓
In-Memory Hadoop Acceleration	✓	✓
Distributed In-Memory File System	✓	✓
Advanced Clustering	✓	✓
Distributed Messaging	✓	✓
Distributed Events	✓	✓
Distributed Data Structures	✓	✓
Portable Binary Objects	✓	✓
Management & Monitoring GUI		✓
Enterprise-Grade Security		✓
Network Segmentation Protection		✓
Recoverable Local Store		✓
Rolling Production Updates		✓
Data Center Replication		✓
Integration with Oracle GoldenGate		✓
Basic Support (9x5)	✓	✓
Enterprise Support (9x5 and 24x7)		✓
Security Updates		✓
Maintenance Releases & Patches		✓

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w/ optional Paid Support

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THANK YOU