



Resistance is Futile: The Next Generation Enterprise Architecture

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Agenda

- Current State
 - History
 - Moving Forward
- The Next Enterprise Architecture
- Business Implications
- Concrete Implementations

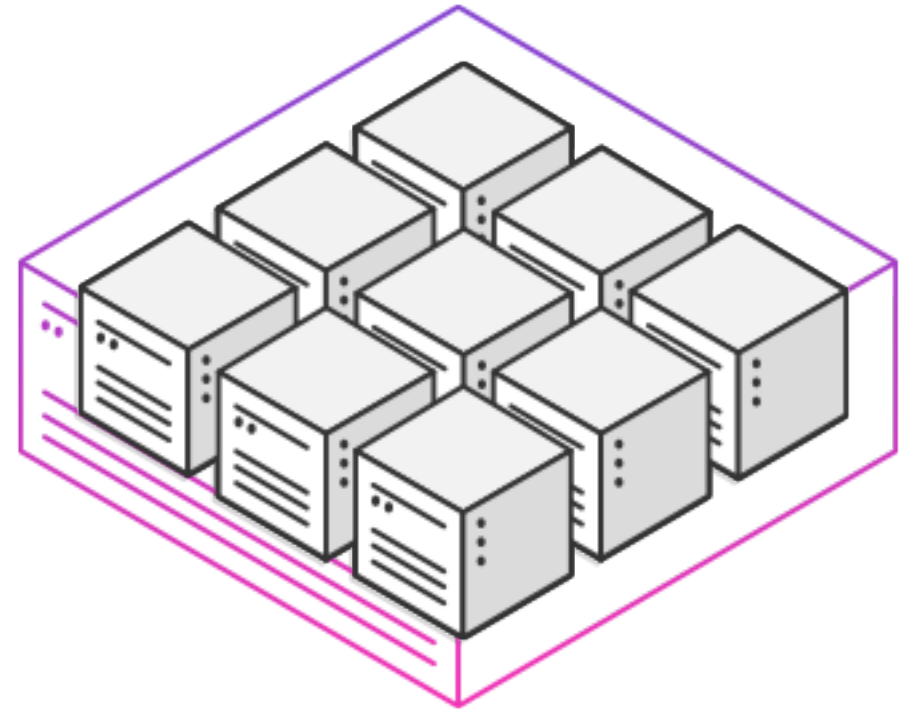


Current State



Study History to Prepare for the Future

- A data center was built
- The servers were statically partitioned
- If we want to break the cycle we have to break the partitions and become dynamic



Understanding the Why's

- Isolation of resources
 - Assists in troubleshooting
 - Prevents the analytics team from impacting production
- Maximum throughput of an application
 - Guaranteed volume (maximum): compute, memory and storage
- Business Continuity
 - We know exactly what is backed up, when, and where
 - Difficult to perfect and to test



Issues with Isolated Workloads

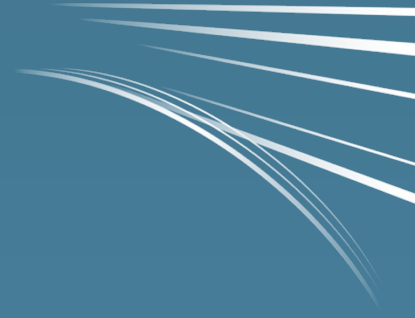
- Segregated servers lead to under utilized hardware
 - Wasted capacity and energy
- Complicated processes to move data to the required processing servers
 - Operational impact, including extra monitoring
 - Time delays moving data (not real-time)
 - Troubleshooting time when there are issues
- Difficult to thoroughly test DEV vs. QA vs. Production
 - Environments have different shapes and sizes
 - They will not have identical configurations



Goals Moving Forward

- Leverage all existing hardware
- Create isolation in a different way
- Improve production operational processes
- Fix process of moving from DEV to QA to Production
- Support **real-time** business continuity





The Next “Last” Enterprise Architecture



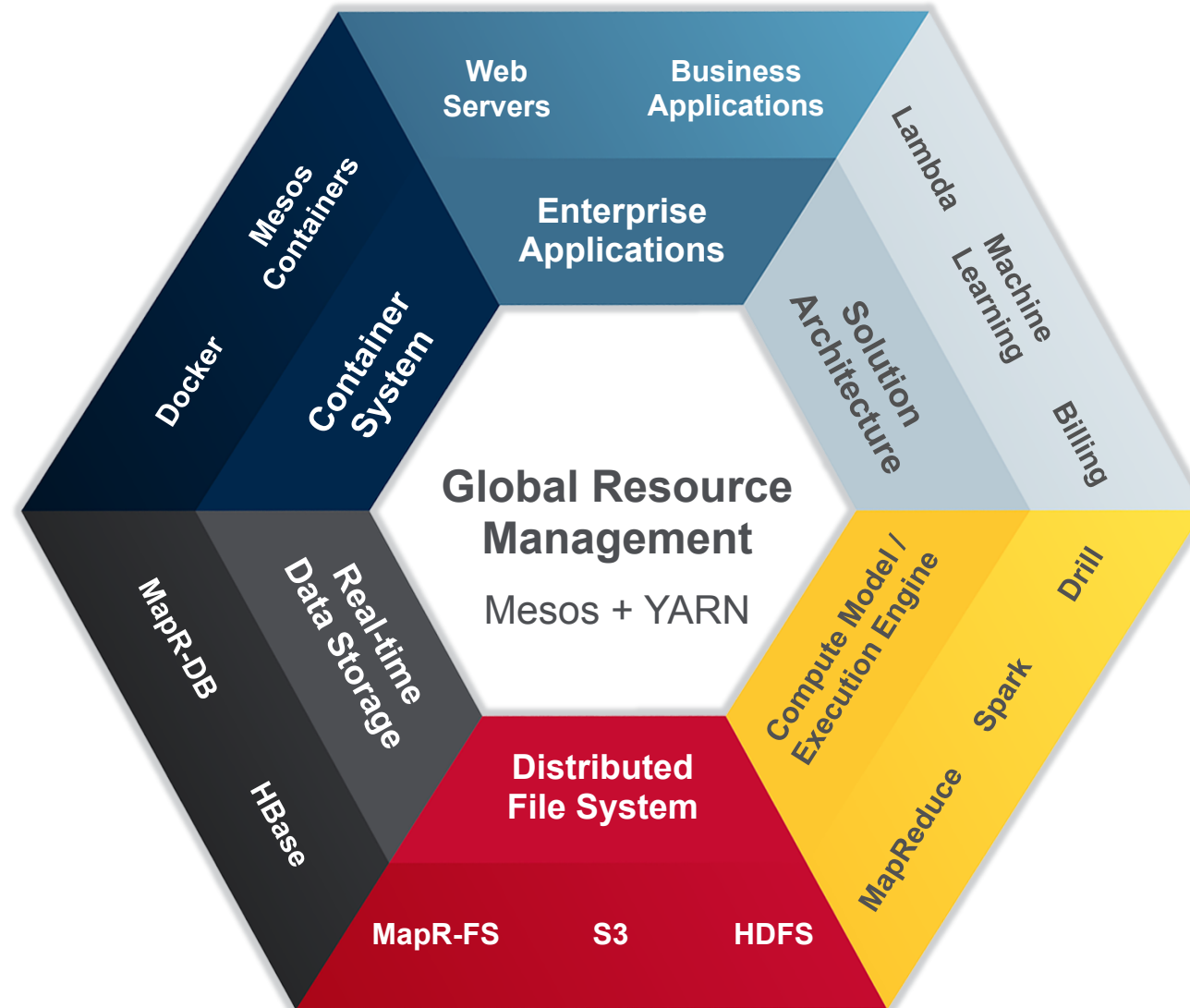
The Next Generation Enterprise Architecture

- Dynamic compute resources
- Common storage platform
- Real-time application support
- Flexible programming models
- Deployment management
- Solution based approach
- Applications to operate a business

** This is a pluggable architecture*



Technologies That Work



A large, black, stylized logo consisting of a bold 'Z' followed by a cursive 'c' that loops around and ends in a tail.

We Will Call This Architecture...

What's in a Name



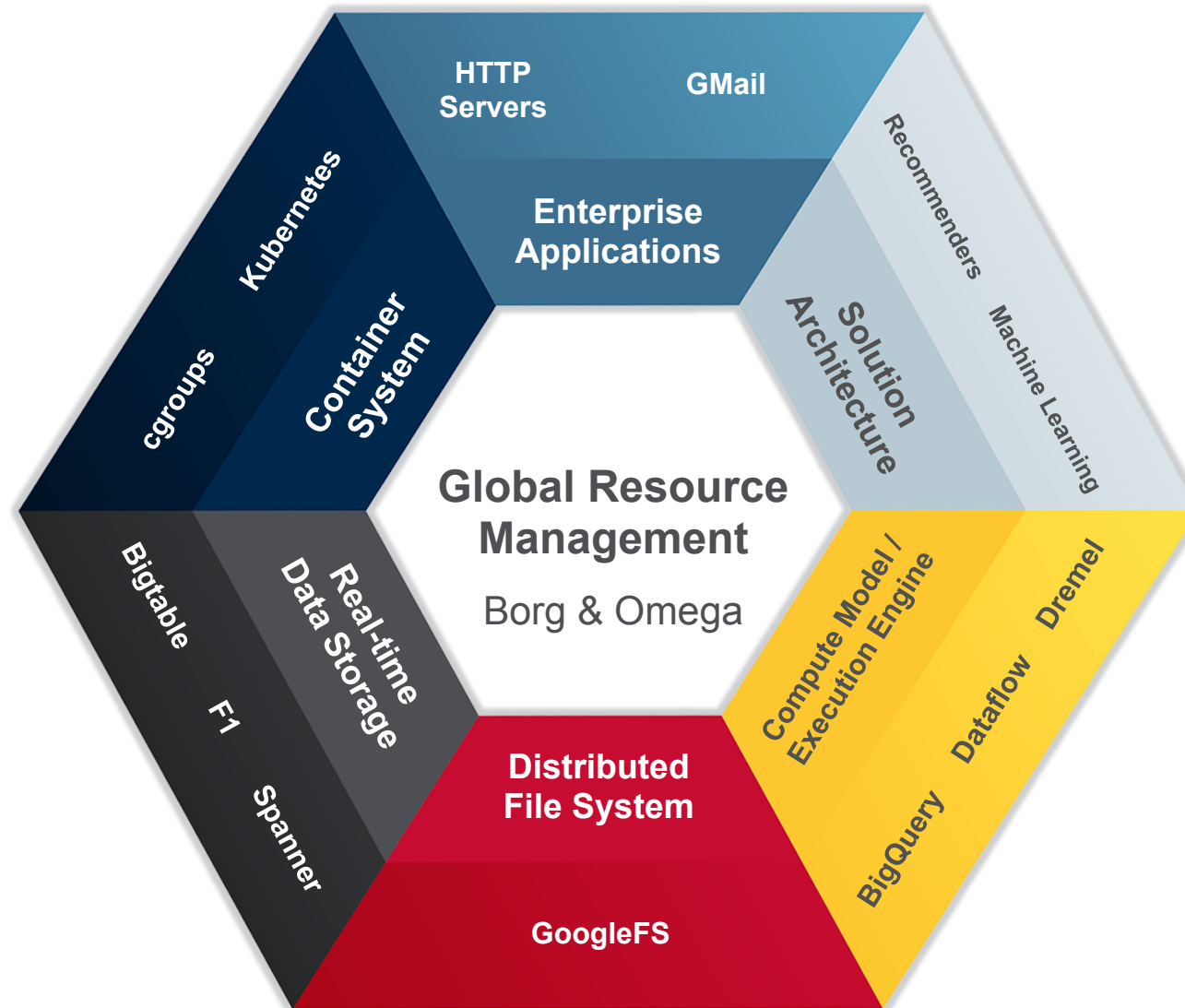
- The letter Z is the last letter in the English alphabet, but Zeta is not the last letter of the Greek alphabet
 - But this is the last generalized architecture you will need.
- Sixth letter of the Greek alphabet
 - Hexagon represents the 6 surrounding pieces
- Zeta represents the number 7
 - 7 total components in this architecture
 - Components work with a global resource manager

Origin Story of the Zeta Architecture

- Cultivated by Jim Scott
 - Created the pretty diagrams
 - Put a nice name on it
 - Documented the concepts
- Not really a new concept
 - Google pretty much pioneered these technology concepts
 - They have never really discussed it cohesively in this way



Zeta Architecture at Google

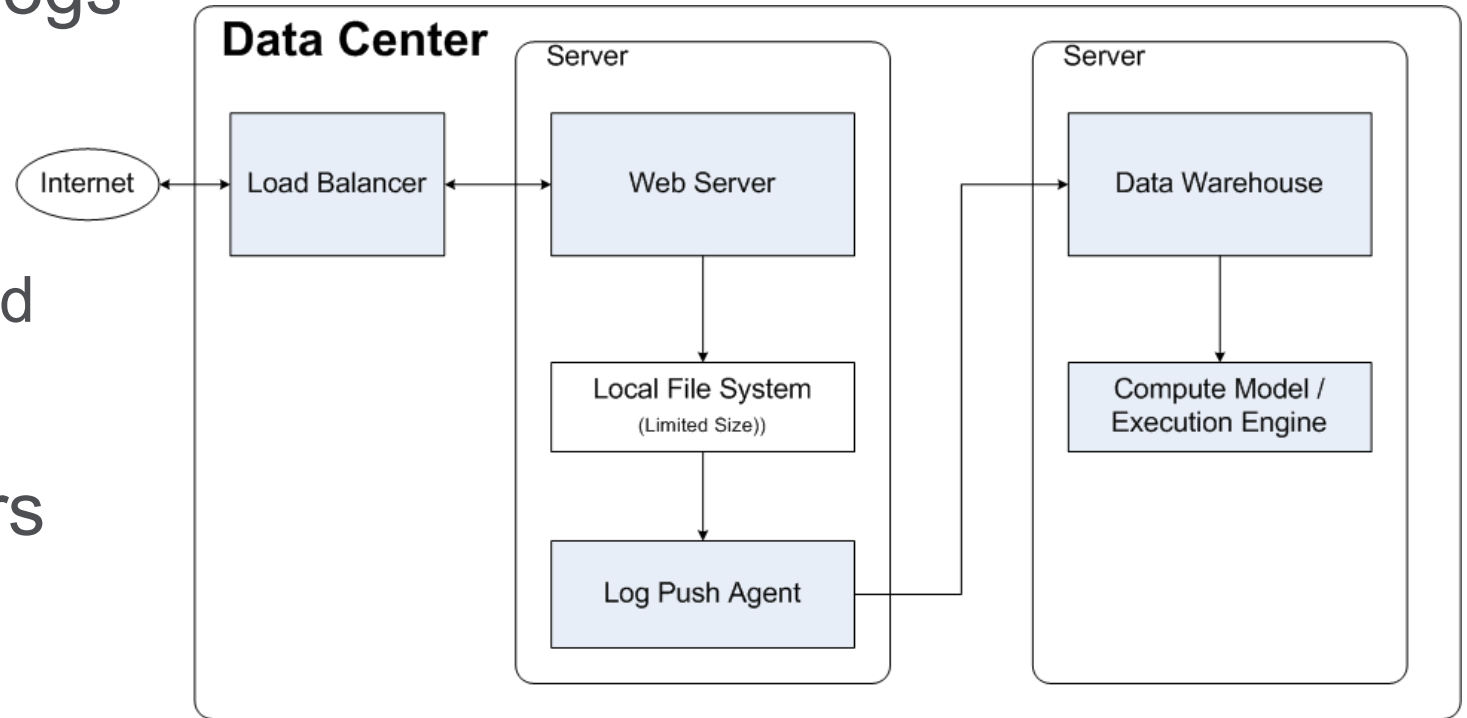


Concrete Implementations



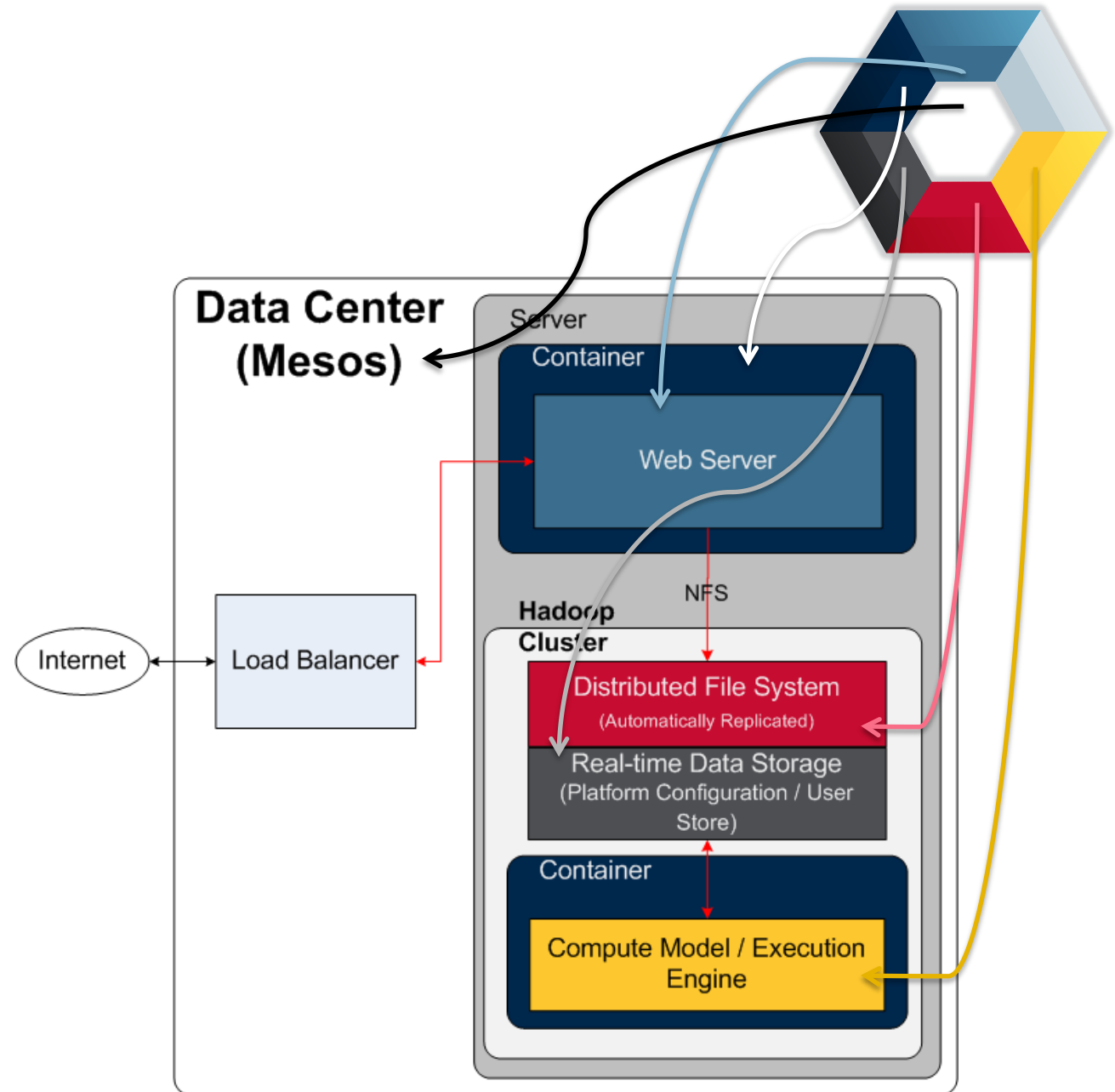
Web Server Logs

- Web server generates logs
- Land on local disk
 - Logs periodically rotated
- Shipped to other servers
- Run jobs on logs

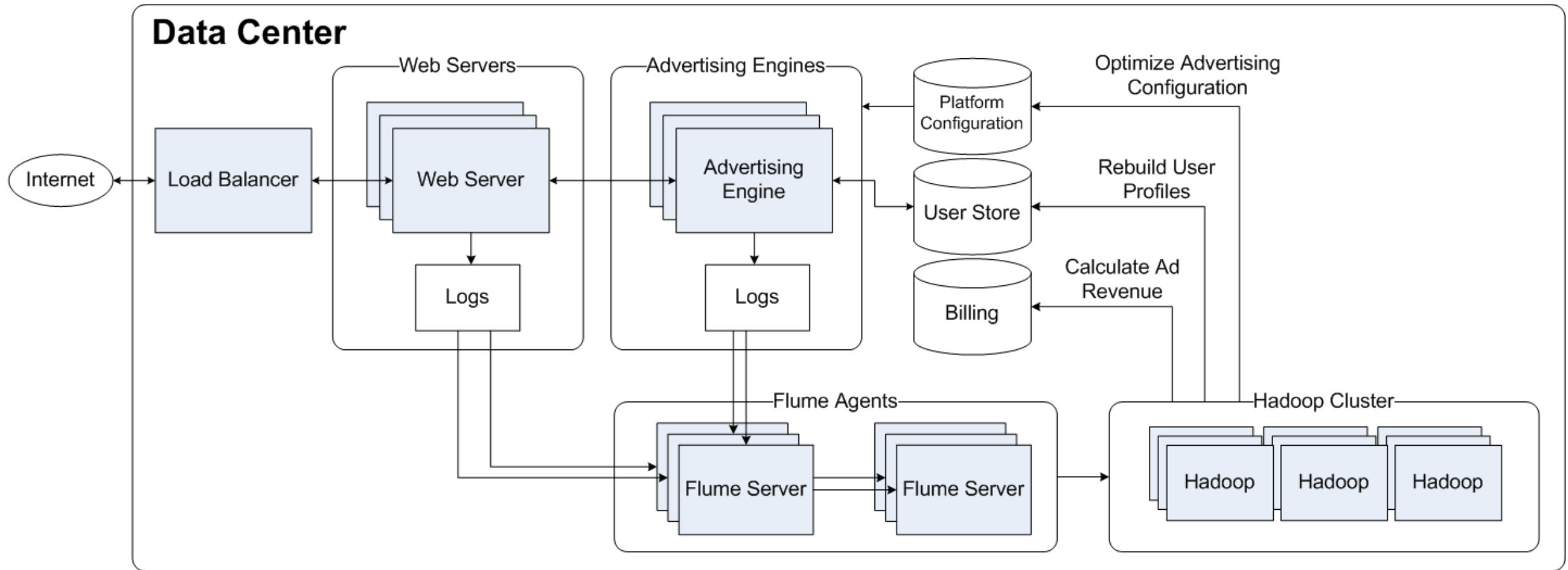


Web Server Logs

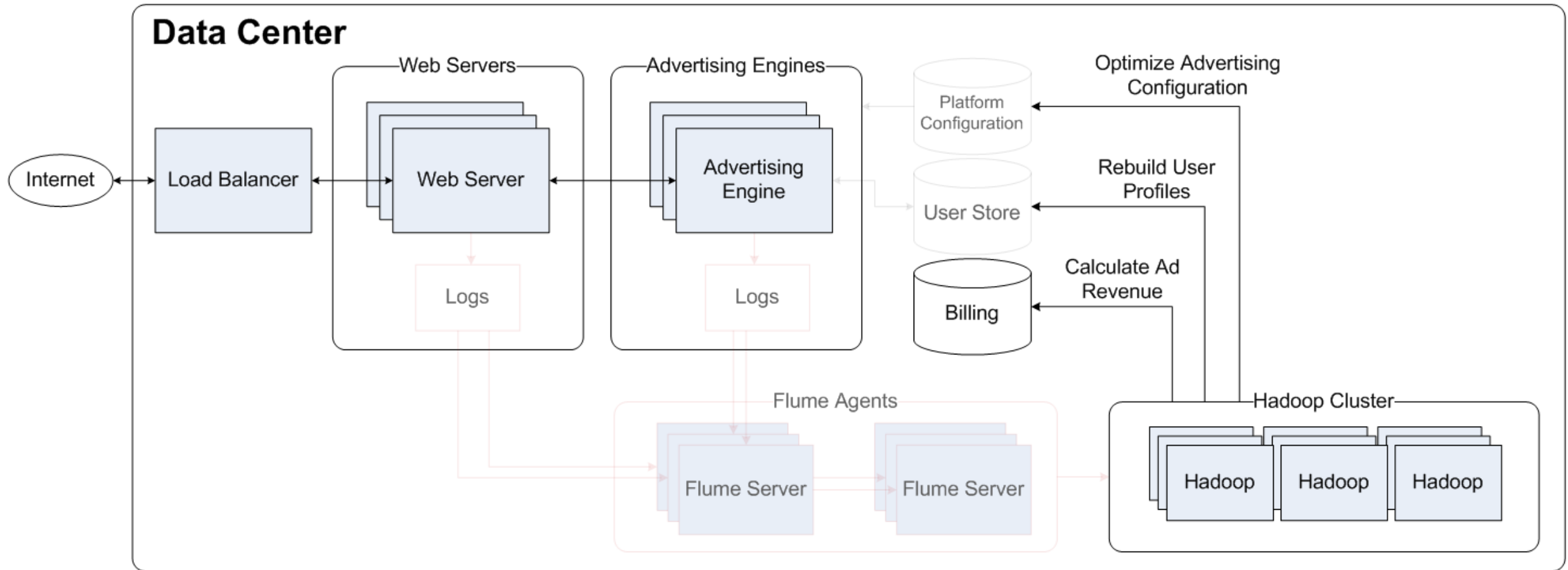
- Web server generates logs
- Land on DFS
 - Logs still rotate
 - Logs now tolerant of a server failure prior to rotation
 - Logs are instantaneously available for computation
- Run jobs on logs
 - Data locality



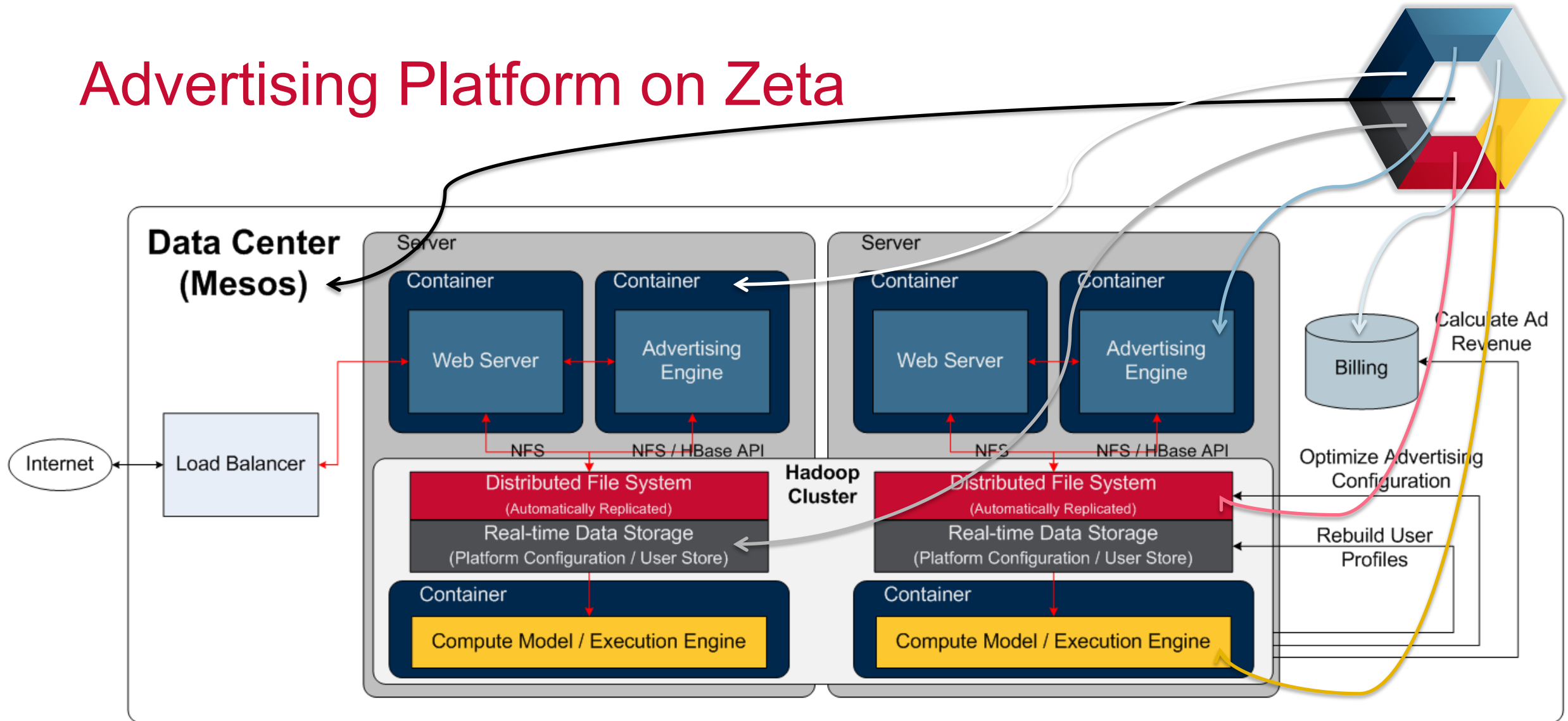
Advertising Platform



Advertising Platform - Simplified



Advertising Platform on Zeta

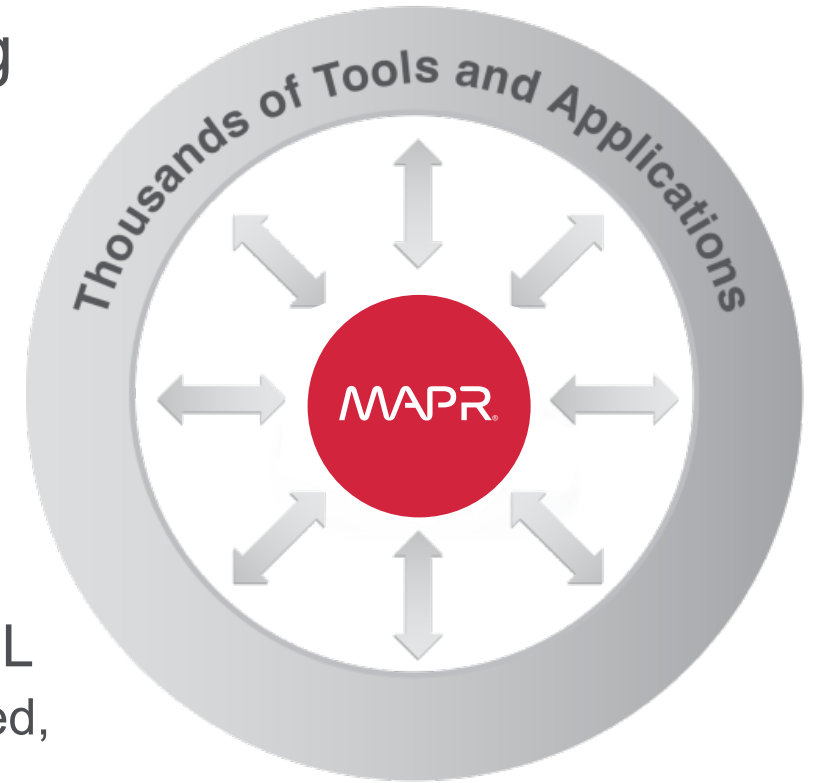


Business Implications



Integration of Existing Systems

- Use standards like NFS to connect existing systems
- Pluggable security models fit into your companies current standards
- Not everything works well in this model
 - Oracle, DB2, SQL Server, PostgreSQL, MySQL
 - They tend to not support being resource managed, containers or other DFS
 - Applications in this architecture can still use them
 - If they start supporting these technologies then things change



Rethink the Data Center

- All Servers
 - Run Mesos
 - Participate in the Distributed File System
- Dynamic Allocation of Resources
 - Spin up more web servers
 - Custom Business Applications
 - Big Data Analytics
- Data Locality
 - No more shipping data
 - Store and process the data where it was created



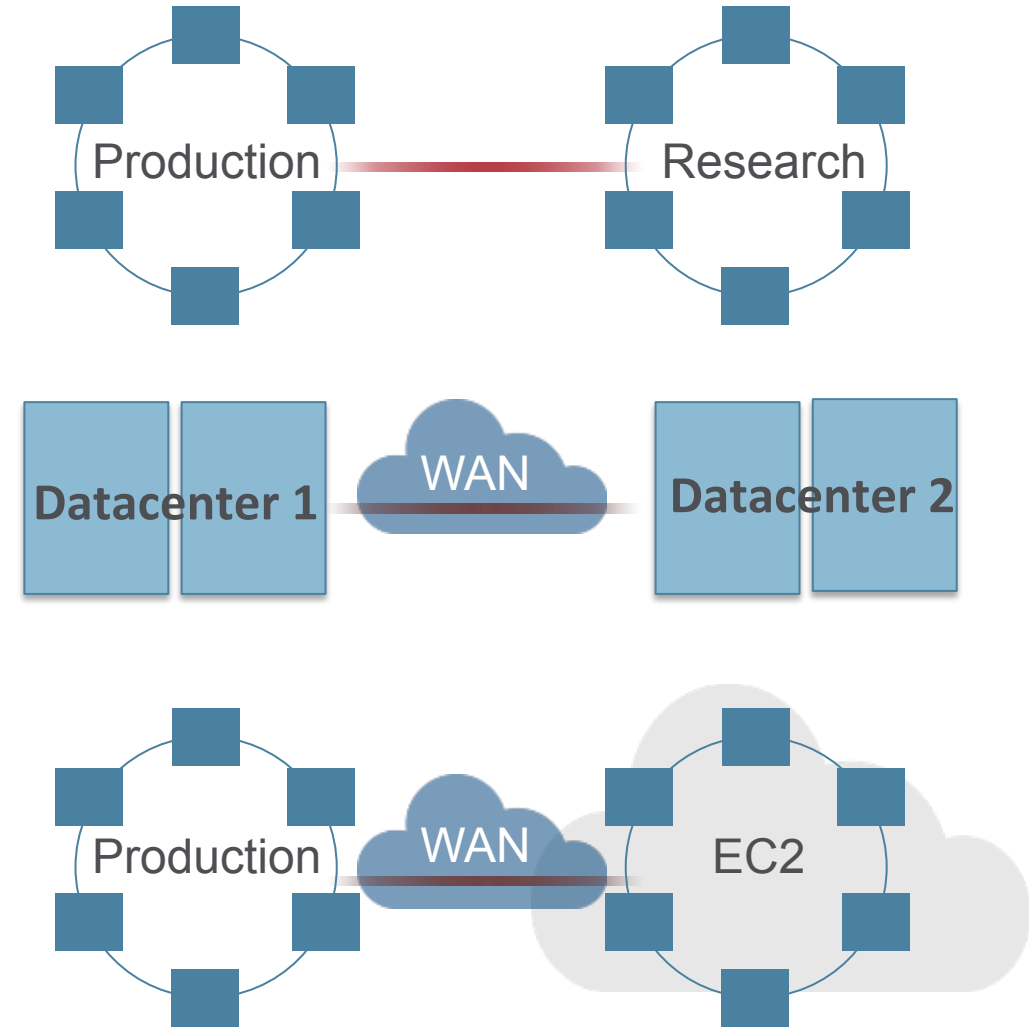
Simplified Architecture

- Less moving parts
 - Less things to go wrong
- Better resource utilization
 - Scale any application up or down on demand
- Common deployment model (new isolation model)
 - Repeatability between environments (dev, qa, production)
- Shared file system
 - Get at the data anywhere in the cluster
 - Simplifies business continuity



Business Continuity

- Resilience
 - Redundancy
 - High Availability
 - Spare Capacity
- Recovery
 - Snapshots
 - Disaster Recovery
- Contingency
 - Protect against the unforeseen
 - Multisite Capability



Platform-wide Security and Compliance

- Authentication, Authorization, Auditing
 - Users and jobs
 - All tiers
- Data protection
 - Wire-level encryption between servers
 - Masking
- Regulatory Compliance
 - Automatic expiration of “old” data
 - Data locality supported by distributed file system



Net Benefit

- Reduced operating expenses (OPEX)
 - Better utilization of available capacity and data center space
- Reduced capital expenses (CAPEX)
 - Less total hardware needed
- Improves time to market
 - Streamlined deployments
 - Environments become consistent and predictable
- Delivers a competitive advantage
 - Via platform scaling
 - Performance improvements



Recap

- Saves valuable time and money
- Enables stronger business continuity capabilities
- Google has been doing this for years
 - Real-time is the crux of everything Google does
- Time for the rest of us to operate at Google scale
 - The technologies are there and they play together nicely
 - Process changes must occur internally to achieve this architecture
- This approach will become the “traditional” way of thinking
 - Don’t get beat to it by your competitors



Go Forth and Implement the Zeta Architecture

Zz

Q&A

Engage with us!

@kingmesal



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