



Coherence Clustering and Consensus

Data Integrity and Consistency



- Is fundamental for transactional systems
 - Without integrity and consistency, transactions aren't reliable
- Is **easy** to achieve on single server systems
 - The service is alive or it isn't
 - Data ownership is unambiguous
 - Clients have “consensus” about the authority of service
 - ...because there is only one!

Data Integrity and Consistency



- Is **non-trivial** to achieve across multi-server systems
 - Networks introduce unpredictable outages
 - Garbage collection, swapping & paging introduce outages
 - Data ownership may become ambiguous (due to outages)
 - Clients may not have “consensus” regarding authority of service
- **Consensus** is mandatory to ensure data integrity and consistency in any transactional system

Data Integrity and Consistency



- Almost all multi-server systems that require consensus rely on a single-point of storage to achieve and maintain consensus
- Coherence is very different
- Coherence uses custom network protocols to maintain cluster consensus
- Coherence doesn't require storage to maintain consensus

Coherence Consensus



- Coherence Consensus = an agreement between a set of processes as to the membership of a cluster at a point-in-time
- Coherence Consensus enables an unambiguous dynamic **failover plan** to **always** be in place
- Coherence Consensus enables **reliable** partitioning of Data and Services
 - No overlap
 - No missing responsibilities
 - No ambiguity

Coherence Consensus



- Coherence implements consensus without requiring
 - A Database
 - A File System
 - Multicast
 - Voting
 - Server / Service / Data Registries
 - Master / Slave Architectures
 - Client / Server Architectures
 - Agent / Broker Architectures
 - Service Repositories
 - A container of any kind
 - SOA stack

Coherence Consensus



- Coherence Consensus is built on
 - A proprietary network stack called TCMP
 - TCMP = The Consensus Management Protocol
 - TCMP = Tangosol Coherence Management Protocol
- TCMP
 - Peer-to-Peer Unicast-based Data Transmission Protocol
 - Optional support for Multicast
 - Significantly more advanced features than TCP/IP
 - Flow Control, Cluster-Wide Security, Packet Bundling, Multi-way (switch-less) Routing
 - Out-of-band consensus information

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