HO5604 **Deploying MongoDB** A Scalable, Distributed Database with SUSE Cloud

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Agenda

- SUSE Cloud Overview
 - Getting familiar with the Cloud way
- What is MongoDB?
 - The new workloads
- Hands On

A SUSE Cloud Overview

SUSE Cloud



Enterprise OpenStack distribution that rapidly deploys and easily manages highly available, mixed hypervisor laaS Clouds

- Increase business agility
- Economically scale IT capabilities
- Easily deliver future innovations

Private Cloud Responsibilities



Platform for Your Data Center Evolution

Enterprise OpenStack Distribution

 Leading open source cloud project delivering fast innovation of advanced IaaS cloud services

Integration with Ceph Distributed Storage

 Reduce costs with a single software-defined storage solution for massively scalable and reliable block, object, and image storage

Driver of Organizational Innovation

 Develop and deploy new applications that take advantage of SUSE Cloud capabilities

Award-Winning Worldwide Support

 Backed by the excellence of SUSE engineering and the only organization with a 20-year history of supporting open source software



Fast Installation and Simplified Management

SUSE Cloud Administration Server

 Faster ROI through faster installation and easier management of OpenStack Cloud

Highly Available Cloud Services

 Maintain business agility and deliver enterprisegrade SLAs through continuous availability of cloud services

Standardized Product Life Cycle

 Packaged product integrated with SUSE update and maintenance processes to ensure simplified enterprise maintenance



SUSE_® Cloud 4



What is MongoDB?

MongoDB

The document-oriented NoSQL database





MongoDB Overview





MongoDB Features

- JSON Document Model
 with Dynamic Schemas
- Auto-Sharding for Horizontal Scalability
- Text Search
- Aggregation Framework and MapReduce

- Full, Flexible Index Support and Rich Queries
- Built-In Replication for High Availability
- Advanced Security
- Large Media Storage
 with GridFS



Drivers and Connectivity

Drivers

Drivers for most popular programming languages and frameworks



Shell

Command-line shell for interacting directly with database





Document Oriented

Relational

			City		
0	Miller	Paul	London		
1	Ortega	Alvaro	Valencia	NO RELATION	
2	Huber	Urs	Zurich		
3	Blanc	Gaston	Paris		
4	Bertolini	Fabrizio	Rome		
R Car ID	Model	Year	Value	Pers ID	
R					
R Car_ID 101	Model Bently	Year	Value	Pers_ID	
R Car_ID 101 102	Model Bently Rolls Royce	Year 1973 1965	Value 100000 330000	Pers_ID 0	
R Car_ID 101 102 103	Model Bently Rolls Royce Peugeot	Year 1973 1965 1993	Value 100000 330000 500	Pers_ID 0 0 3	
R Car_ID 101 102 103 104	Model Bently Rolls Royce Peugeot Ferrari	Year 1973 1965 1993 2005	Value 100000 330000 500 150000	Pers_ID 0 0 3 4	
R Car_ID 101 102 103 104 105	Model Bently Rolls Royce Peugeot Ferrari Renault	Year 1973 1965 1993 2005 1998	Value 100000 330000 500 150000 2000	Pers_ID 0 0 3 4 3	
R Car_ID 101 102 103 104 105 106	Model Bently Rolls Royce Peugeot Ferrari Renault Renault	Year 1973 1965 1993 2005 1998 2001	Value 100000 330000 500 150000 2000 7000	Pers_ID 0 0 3 4 4 3 3 3	

MongoDB

{

}

<pre>first_name: 'Paul',</pre>				
<pre>surname: 'Miller',</pre>				
<pre>city: 'London',</pre>				
location: [45.123,47.232],				
cars: [
{ <pre>model: 'Bentley',</pre>				
year: 1973,				
<pre>value: 100000, },</pre>				
{ <pre>model: 'Rolls Royce',</pre>				
year: 1965,				
<pre>value: 330000, }</pre>				
}				



Flexible, Powerful Querying

Rich Queries	 Find Paul's cars Find cars in London built 1970 - 1980
Geospatial	 Find all of the car owners within 5km of Trafalgar Sq.
Text Search	 Find all the cars described as having leather seats
Aggregation	 Calculate the average value of Paul's car collection
Map Reduce	• What is the ownership pattern of colors by geography over time? (is purple trending up in China?)

MongoDB

{

}

```
first_name: 'Paul',
surname: 'Miller',
city: 'London',
location: [45.123,47.232],
cars: [
    { model: 'Bentley',
        year: 1973,
        value: 100000, ... },
    { model: 'Rolls Royce',
        year: 1965,
        value: 330000, ... }
}
```



Document Model Benefits

- Expressive, Flexible, Simplified Data Modeling
 - A single document can express and encompass a wide variety of notions
 - No need to migrate for simple extensions
 - Fewer collections as most data can be encapsulated in a single document
- Easier Development
 - Developers understand documents as it maps well to their data structures
- Faster Time to Market
 - Agile development means faster results



Performance



Better Data Locality

In-Memory Caching

In-Place Updates



Scaling MongoDB

- Replica Sets
 - Redundancy, failover, high availability
- Sharding
 - Auto-paritions data, read/write scalability
- Multi-datacenter deployments
- Tunable durability, consistency
- Engineered for zero downtime



High Availability



- Automated replication and failover
- Multi-data center support
- Improved operational simplicity (e.g., HW swaps)
- Data durability and consistency



Scalability

Auto-Sharding



- Increase capacity as you go
- Commodity and cloud architectures
- Improved operational simplicity and cost visibility



Sharding and Replication





MongoDB Architecture







Thank you.





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