Emerging trends in software development: The next generation of storage

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Research Director — Development, DevOps & IT Ops

SNIA Storage Developer Conference, Sept 2015
Technology adoption is increasingly bottom-up.
App-dev workloads are **quickly** moving to the cloud

- On-Premises, Non-Cloud
- Off-Premises, Non-Cloud
- On-premises Private Cloud
  - Hosted Private Cloud
- Infrastructure-as-a-Service (IaaS)/Public Cloud
- Software-as-a-Service (SaaS)

Source: 451 VotE Cloud, Q2 2015
Q. Estimate the percentage of your organization’s data currently stored in off premises cloud environments? Q. How many terabytes of data does your company currently have under management across all environments?

"Terabytes of Data Stored in Off-Premises Cloud" is calculated from an organization’s total data and the percent they store in off-premises cloud environments.

The new stack?

An infinite array of possible stacks.
The API economy

The new mode for access and transfer of data has become APIs.
What do enterprises think of storage vendors?

Source: 451 Storage Wave 19, June 2015; n=250
Development trends that will transform storage use
Source: 451 Research, “Now Shipping: The Docker and containers ecosystem rapidly takes shape”
Developers love Docker

Source: http://www.slideshare.net/dberkholz/is-your-community-healthy-metrics-on-the-top-cm-software
But it’s not just a toy

- Discovery and Evaluation: 56.1%
- Running Trials/Pilot Projects: 10.7%
- Used for Test and Development Environment: 3.9%
- Initial Implementation of Production Applications: 4.2%
- Broad Implementation of Production Applications: 2.1%
- No Plans: 19.8%
- Unfamiliar: 3.1%

Source: 451 VotE Cloud, Q1 2015; n=991
Docker to microservices
Loosely coupled teams

“One of the biggest changes is that we no longer have an official ‘architecture’ team. Instead, we have made ‘architecture’ an ‘ingredient’ on each of our teams.”

– Lauri Apple, Gilt Groupe, 14 Nov 2014
The **foundation** of microservices

Amazon EC2 Container Service
Disruption in data processing
Spark came out of nowhere
On Hacker News, too

Source: http://redmonk.com/dberkholz/2015/03/13/the-emergence-of-spark/
The market is **coming**

46% 2014-19 CAGR

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
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<tbody>
<tr>
<td>2014</td>
<td>$531</td>
</tr>
<tr>
<td>2015</td>
<td>$863</td>
</tr>
<tr>
<td>2016</td>
<td>$1,308</td>
</tr>
<tr>
<td>2017</td>
<td>$1,904</td>
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<tr>
<td>2018</td>
<td>$2,634</td>
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<td>2019</td>
<td>$3,507</td>
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Storage-class memory
Concurrency for developers

Development trends that will transform storage vendors
What in the world is DevOps, anyhow?
Agile, truly tip to tail

Business to customer
3 pillars of DevOps

Culture

Automation

Measurement
Culture: Tear down all the silos
Automation: Pets vs Cattle
Automation: Infrastructure as code

CFEngine

puppet labs

CHEF

SALTSTACK

ANSIBLE
Knight Capital and the $460 million bug

Release management – quarterly to daily
Gary Gruber, HP
**Automation**: Continuous delivery

[Diagram showing the lifecycle of software development: plan, code, build, test, release, deploy, operate. There are arrows indicating DevOps, Continuous Delivery, Continuous Integration, and Agile Development. The text emphasizes the importance of collaboration.]

continuousautomation.com
Measurement: #monitoringsucks/monitoringlove
DevOps is reaching DBAs

**Figure 13: Other DevOps Stakeholders**

QMG - Beyond IT operations and developers, what stakeholders are involved in your modern IT management or DevOps initiatives and strategies?

- Database administrators and data analytics teams: 67%
- Lines of business managers: 45%
- Technology center of excellence or similar group: 56%
- Security: 50%
- Other, please specify: 1%

451 DevOps study, Q3 2014
Recent Storage Team Structure Changes

Change of Storage Team Structure

- Yes: 35%
- No: 65%

Description of Storage Team Structure Change

- Outsource/Reduce Staff: 29%
- Staff Growth: 21%
- Disperse Storage Team: 17%
- General Reorganization: 12%
- More responsibility: 5%
- Consolidating Teams: 5%
- Service Driven: 3%
- Moving to Specialized Team: 3%
- Insourcing: 2%
- Executive Changes: 2%

Left Chart: Q. Has the storage team structures changed significantly in the past 12 months? n=237; Right Chart: Q. Please describe. n=58.
### Adopting open-source technologies

<table>
<thead>
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<th>Score</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>P</strong></td>
<td>Meets the grade-level standard by demonstrating proficiency of the content or processes for the Measurement Topic</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>In progress toward meeting the grade-level standard</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>Not yet making progress or making minimal progress toward meeting the grade-level standard</td>
</tr>
<tr>
<td><strong>M</strong></td>
<td>Missing data—no grade recorded</td>
</tr>
<tr>
<td><strong>NEP</strong></td>
<td>Not English Proficient; may be used for ESOL Level 1 and 2 students for no more than two marking periods</td>
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</table>

**PROFICIENT**—A score of P means your child is successful in using the content and processes at the grade level.

**NOT YET PROFICIENT**—A score of I or N means your child is not yet meeting the grade-level standard.
The changing role of **standards**
The changing role of **benchmarks**

**Torturing Databases for Fun and Profit**

Mai Zheng, *The Ohio State University*; Joseph Tucek, *HP Labs*; Dachuan Huang and Feng Qin, *The Ohio State University*; Mark Lillibridge, Elizabeth S. Yang, and Bill W. Zhao, *HP Labs*; Shashank Singh, *The Ohio State University*

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**Call me maybe: Carly Rae Jepsen and the perils of network partitions**

2013/09/17

Software, Network Distributed Systems Jepsen

This article is part of [Jepsen](#), a series on network partitions. We’re going to learn about distributed consensus, discuss the CAP theorem’s implications, and demonstrate how different databases behave under partition.
Wrapping up

• Docker and microservices will exacerbate hypervisor-style use & increase demands on the network

• Spark will drive requirements for memory and memory-like storage

• DevOps & continuous delivery will transform how you deliver storage software

• The interplay between open source, standards and benchmarks continues to tilt toward agility
Global Digital Infrastructure Alliance — 20,000 strong

Share your thoughts, get our data
451alliance.com
Storage needs to cope with agility.

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