

DE LA RECHERCHE À L'INDUSTRIE

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# Reconsidering Storage

## Synergy controllers for fog computing

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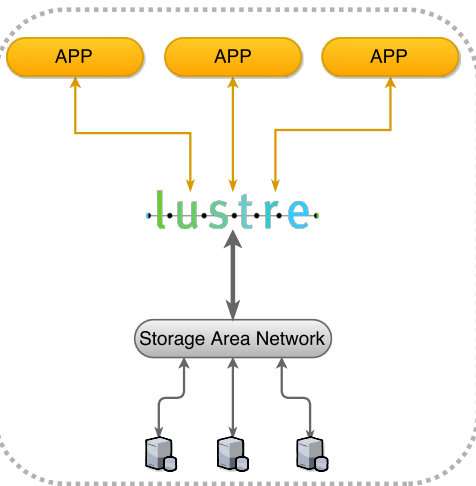
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## 3-dimension Goals

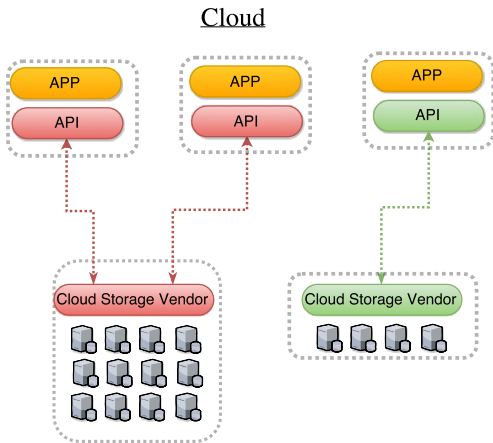
- A system to isolate application's storage
  - Define per application requirements
  - Transparent integration to applications
- A magic bubble to
  - Decouple API from data presentation
  - Decouple functionality from I/O
- A framework for rapid prototyping of storage systems
  - Asynchronously connected layers of functionality
  - Pluggable controllers with Producer/Consumer interfaces

## HPC



- Apps/Storage, same roof
  - High bandwidth links (dash-lines)
  - Mostly shared-disk architecture
- Filesystem interfaces
  - OS binded
  - Posix limitations
  - I/O aware apps → bad code
- Lifecycle management
  - 3rd party software
  - Administrator defined QOS
  - Oblivious to the application

Major player: [The Administrator](#)



- Apps/Storage, different roofs
  - Low bandwidth links (dot-lines)
  - Blackbox vendors → Lock-in (API, policies)
- Application-level semantics
  - OS-agnostic
  - ... but vendor API-binded
  - I/O aware apps → bad code
- Lifecycle
  - Black boxes, No QOS
  - Application delegates data control to the vendor

Major player: **The Developer**

## Fog storage

- Extends intelligence of cloud computing to the edges of the network
- Clients decide which data to store locally and which to send remotely

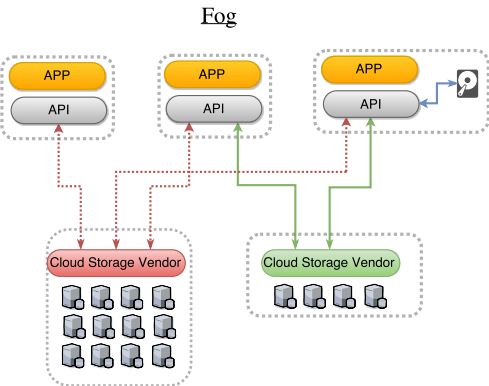
## Devops

- Fills the gaps between developers and administrators
- Defines both functionality and environment for the application

## Virtualization

- Applications can be executed ANYWHERE
- But they are still binded to static storage resources

## We need a magic bubble to bring:



- Intelligence closer to the application
  - Self-manage lifecycle
  - Qos, Security, Sharing
  - Exploit both local and remote resources
- ... But transparently (I/O agnostic apps)
  - Cross-vendor → No lock-in
  - Perform I/O tasks

Major player: **The Devops**

Problem

- Decouple API from data
- QOS
- Isolation
- Multiple consistency models
- Environment can change
- New functionality is needed
- Performance
- Multi-mode

Assumptions

- Data are reliably stored
- Resources of functionality
- No Interference on host-level
- Interface consistency
- Devops responsibility
- Devops responsibility
- State is not a bottleneck
- Standalone / Service

Tasks

- **API translators**
- Combine resources
- Unique keyspace/resources
- **Transactional language**
- Mutable controller
- **Programmable controller**
- Control/Data planes
- Local / Remote State

Only the 4th quarter of 2016 ...

- Docker acquired Infinitt to decouple containers from storage
- Huawei launched OpenSDS for Industry-Wide Software Defined Storage Collaboration

... It must be interesting !



