

**It's dangerous to go
alone!**

**How about *we* do
this!?**

Questions!

Our needs

Sustainability

Recognition of the benefits of
preservation by decision makers

Process for ***Selecting*** digital
materials with long-term value

Incentive for decision makers to
preserve in the public interest

appropriate *Organization* and
Governance of digital
preservation activities

mechanisms to secure an
ongoing, efficient ***Allocation*** of
Resources for digital
preservation activities

**timely actions to ensure
access**

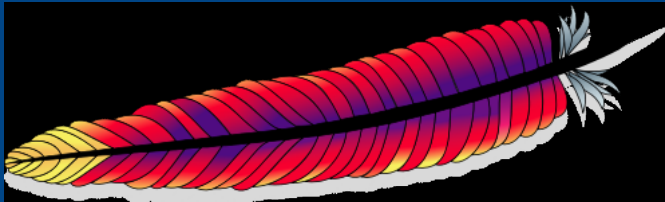
Locally or Consortially?

A photograph of a road blocked by a large snowdrift. A metal barrier with red and black stripes is positioned across the road, supported by orange traffic cones. The background shows a dense forest of evergreen trees under a cloudy sky.

Professional Road Blockers

Source: Adam Jacob, OpsCode: Choose Your Own Adventure: <http://www.youtube.com/watch?v=UD7qOfa4QDk>

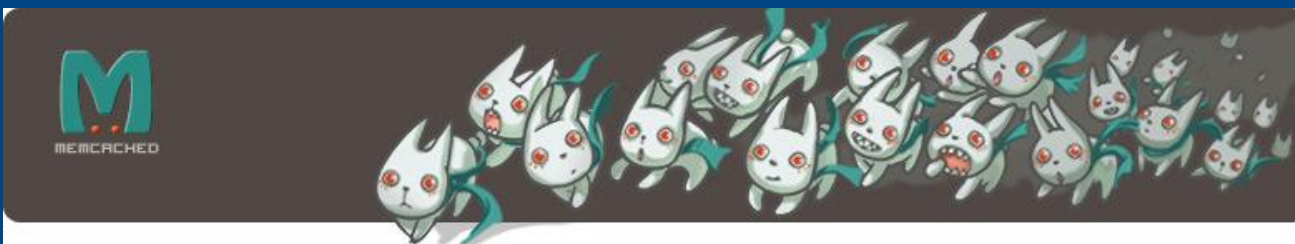
Technology ??



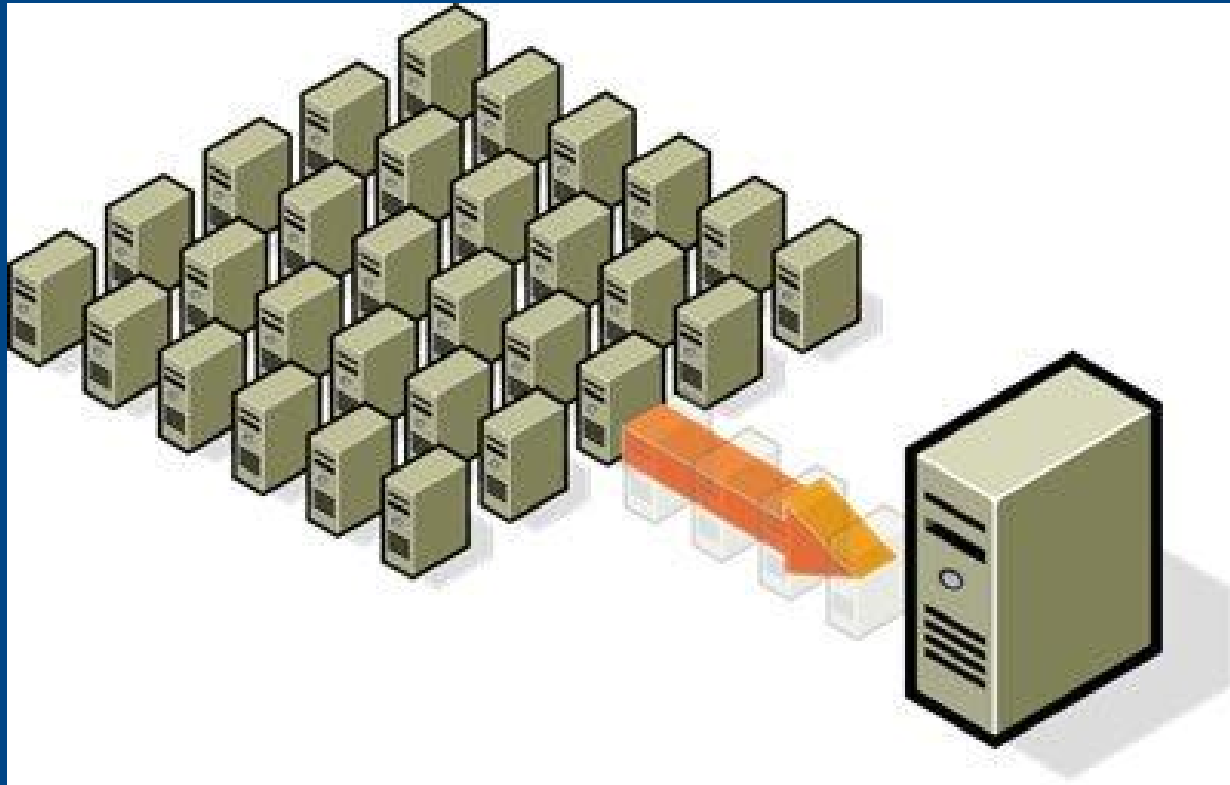
XCache Administration

[Statistics](#) [List PHP](#) [List Var Data](#)

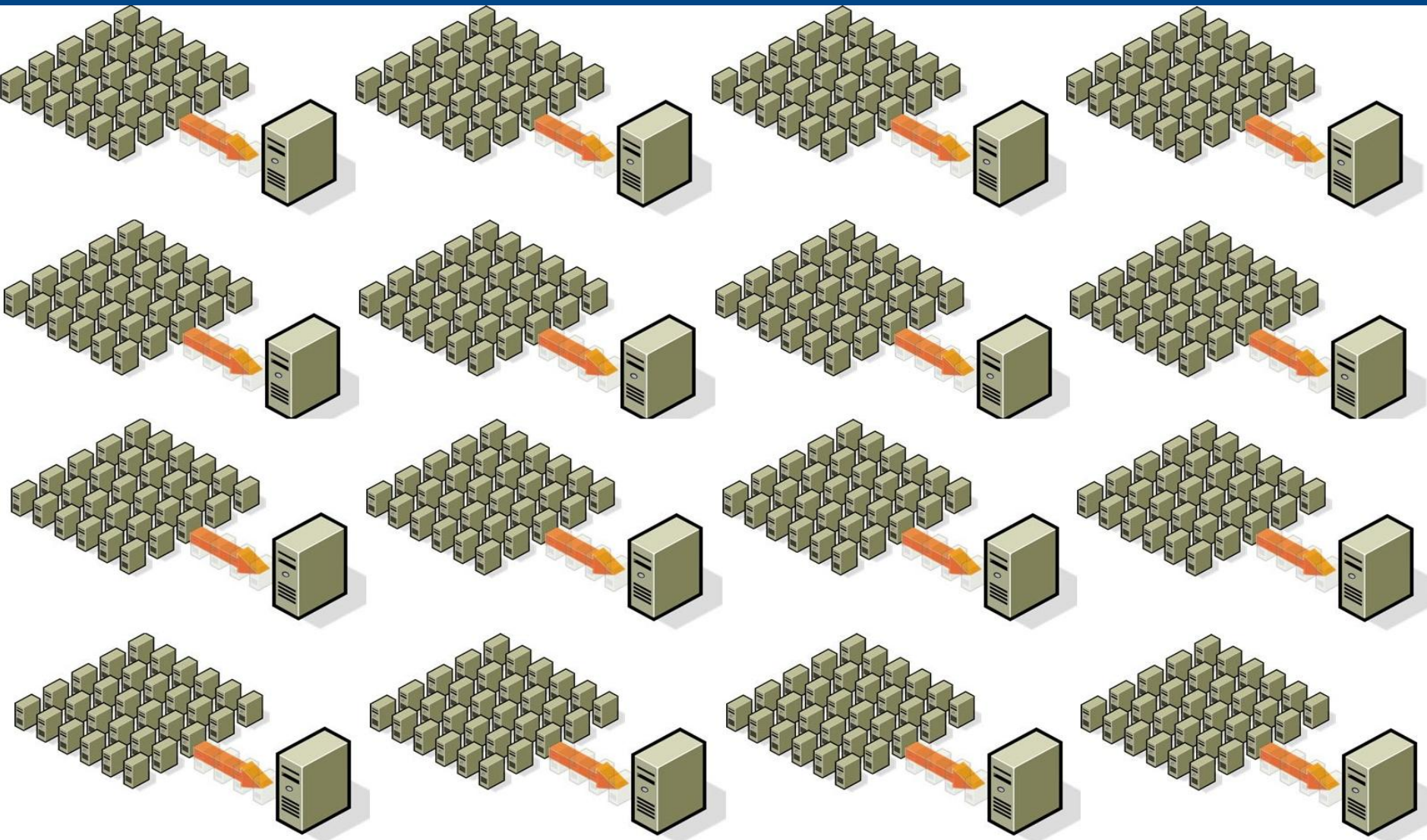
avail	Used	Clear	Compiling	Hits	Misses	CLogs	OOMs	Protected
220	<input checked="" type="checkbox"/>	<input type="button" value="Clear"/>	no	6,204	1,517	0	1,338	no
220	<input type="checkbox"/>	<input type="button" value="Clear"/>	-	0	0	0	0	no



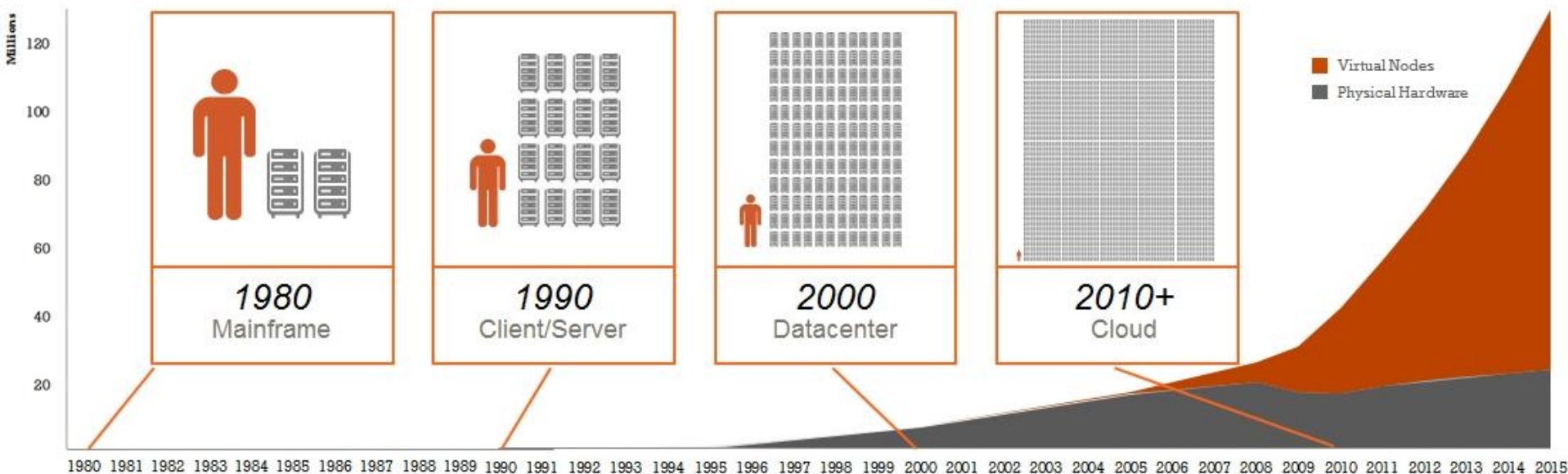
Server Virtualization



Source: <http://www.techcrates.com/use-of-virtual-servers/>



Scale x Complexity > Skills

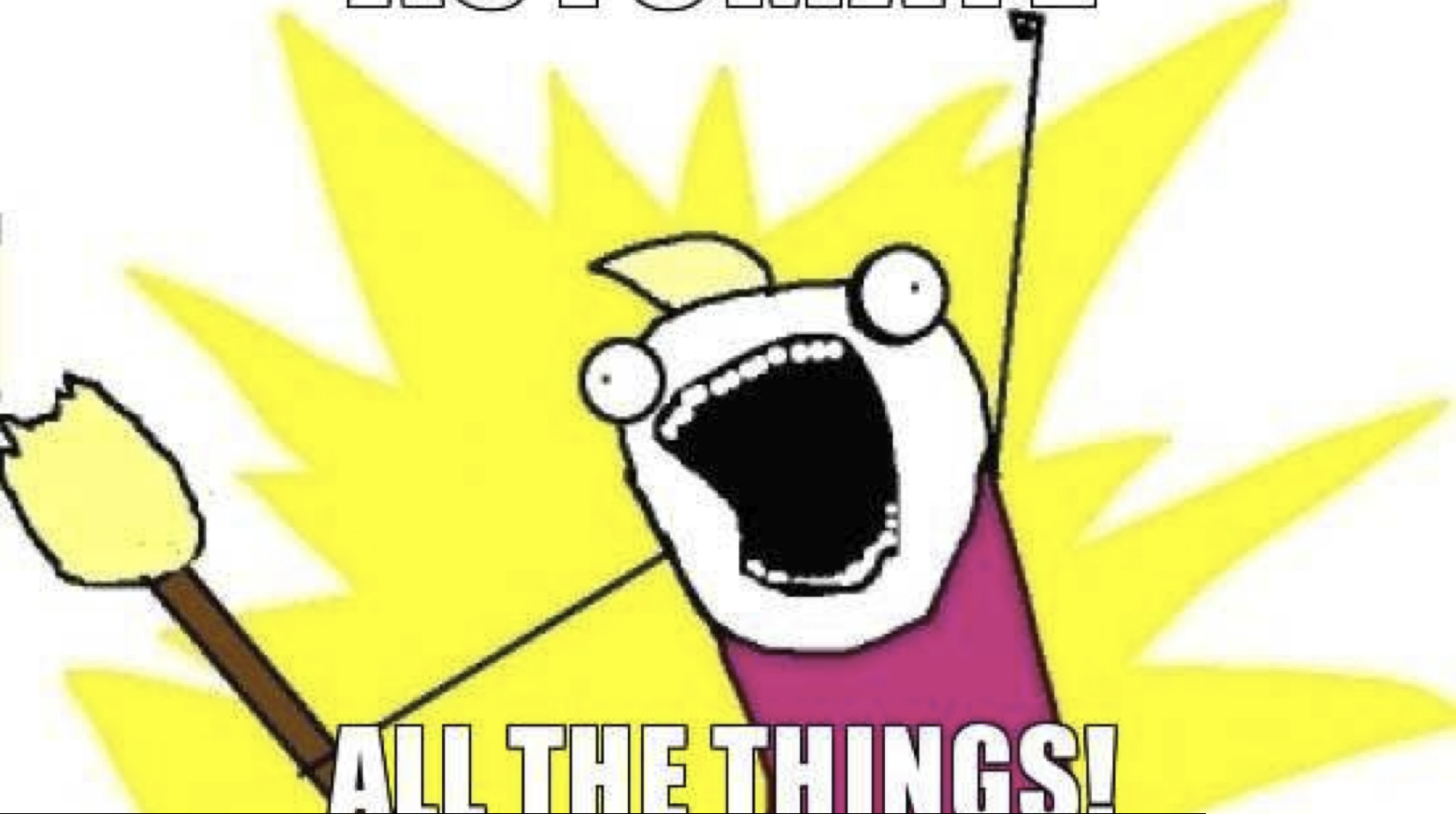


Source: http://www.theregister.co.uk/2012/03/26/oprcode_funding_chef_momentum/

Configuration Management / DevOps



AUTOMATE



ALL THE THINGS!

Hardware commoditization
/ open source hardware

Intel-based x86 servers
dominant in data centres
for 10 years

Nothing particular to
distinguish the products
of different hardware
vendors

Software processes,
virtualization,
configuration management
all well defined



ZDNet / Debates

Hardware: Does it really matter anymore?

Moderated by Lawrence Dignan | January 9, 2012 -- 07:00 GMT (23:00 PST)

Summary: At the 2012 Consumer Electronics Show, hardware will take a backseat to software -- perhaps for good. Is hardware innovation alive and well?



David Chernicoff

It's alive and well

OR

Hardware? Ho-hum


Christopher Dawson

Best Argument: *It's alive and well*
[List of Events:](#)
[Opening Statements](#)
[Rebuttal](#)
[Closing Statements](#)

The moderator has delivered his final verdict.

Opening Statements

Hardware is what makes it possible

David Chernicoff: No matter how interesting software is, or how exciting the user experience becomes, without continued innovation in hardware technologies, software will begin to

Merely a matter of preference

Chris Dawson: As the world moves online, hardware has become nothing more than a religion. I tend to use Macs because I like the OS and the hardware takes the abuse I give it. On

ZDNet

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As Companies Focus on Services, Will Hardware Become Irrelevant?

Published: November 07, 2012 in Knowledge@Wharton



In recent weeks, Amazon.com, Microsoft and Apple have all held splashy events to tout their newest tablets -- the Kindle Fire HD, the Surface and the iPad Mini. But even as Amazon CEO Jeff Bezos talked up the specs of the new Kindle Fire, he noted that the market is becoming less about the gadgets themselves, and more about how companies can make money off additional services and purchases that appeal to device users.

Technology companies now see the buying of a tablet as merely the beginning of a long relationship with a consumer -- a relationship that will extend across multiple platforms and content types, with users periodically paying subscription fees or purchasing individual applications, music, movies and television shows. And if the firm is assured of a future payoff, it can offset the losses from charging less for the device.



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But making such a transition is easier said than done, according to Wharton legal studies and business ethics professor [Andrea Matwyshyn](#). "At present, this model is limited to only a few players," she says. "The services model definitely works for Amazon, given its content library with books and its expansion into [streaming] movies

Rethinking the hardware
entirely: open source
hardware



OPEN
Compute Project

5 System View

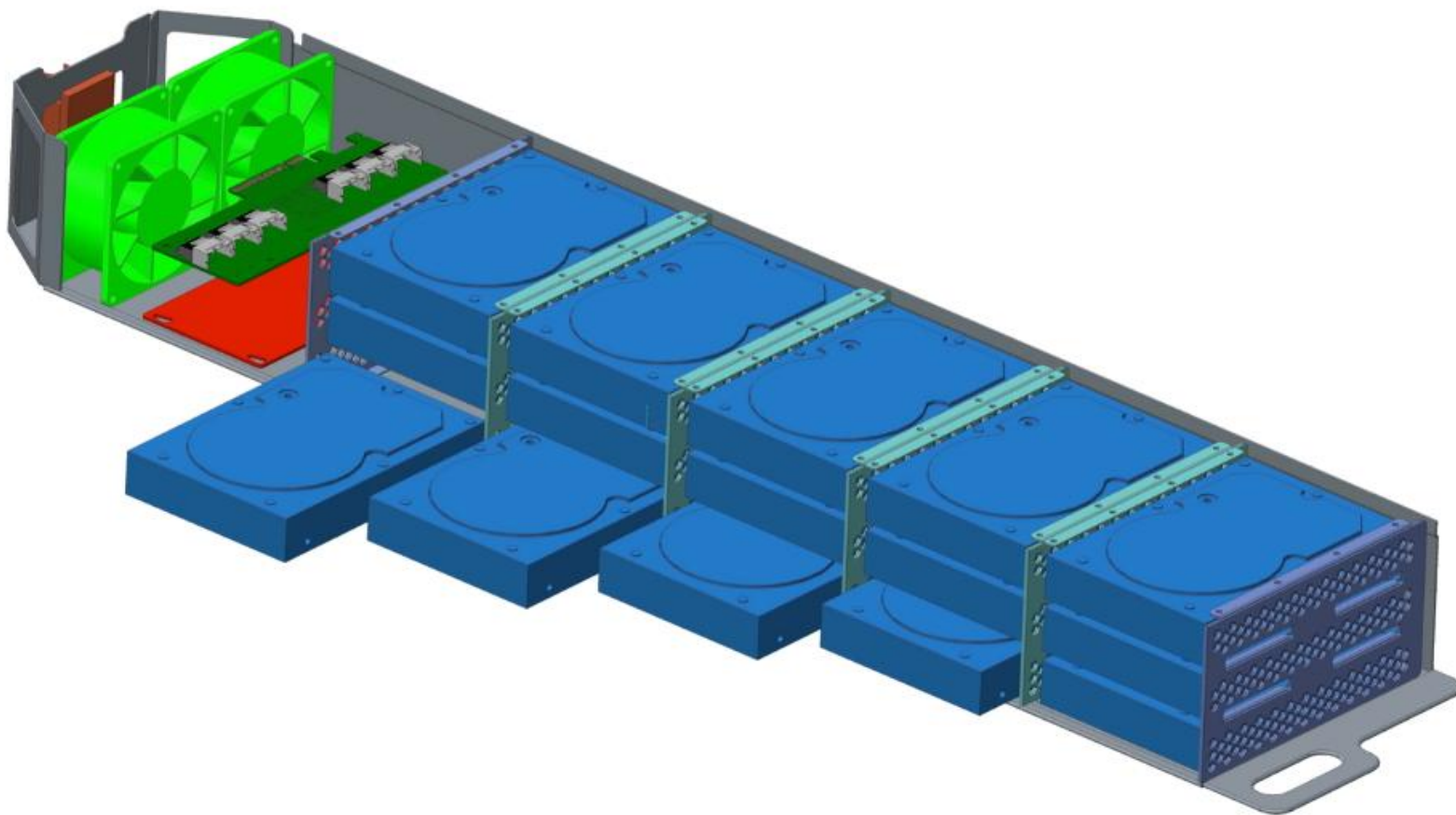
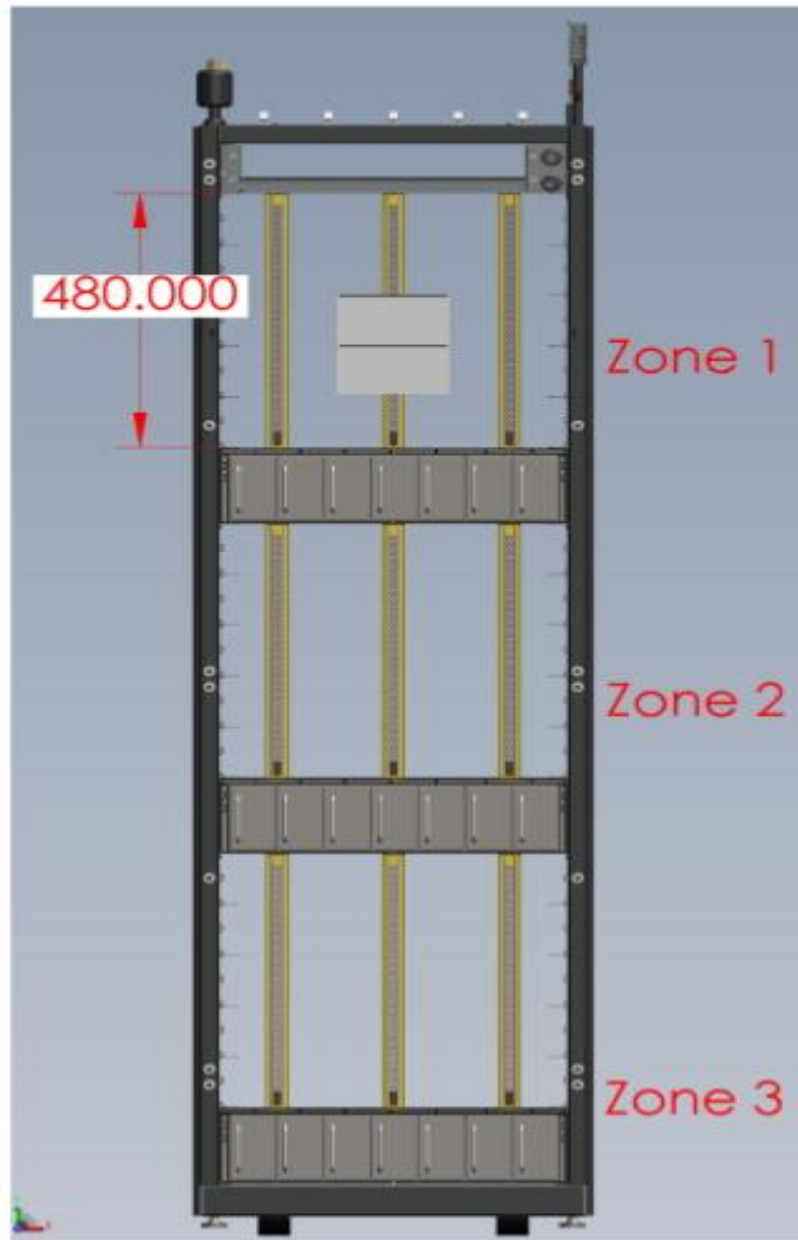
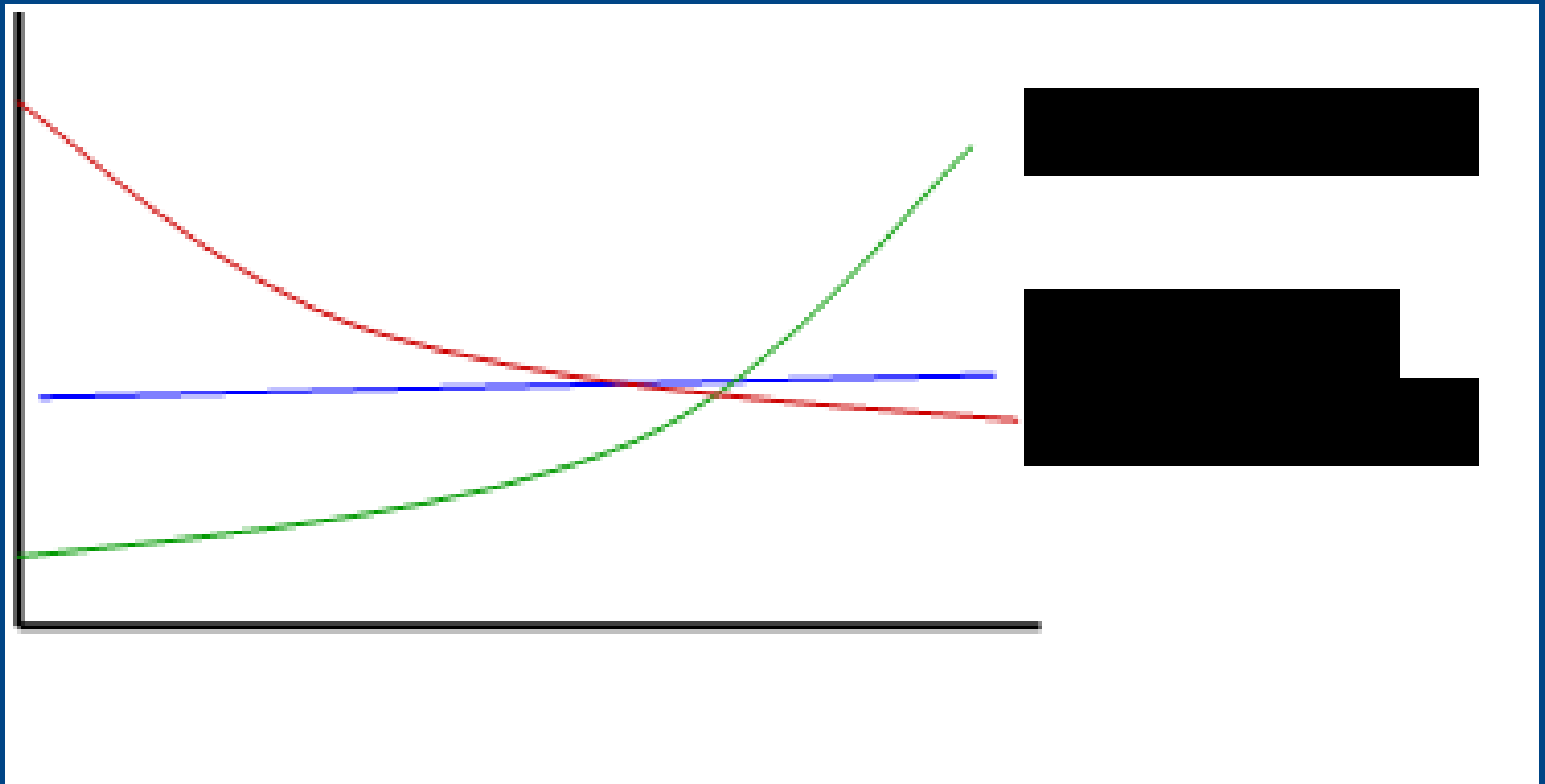


Figure 1 System Overview

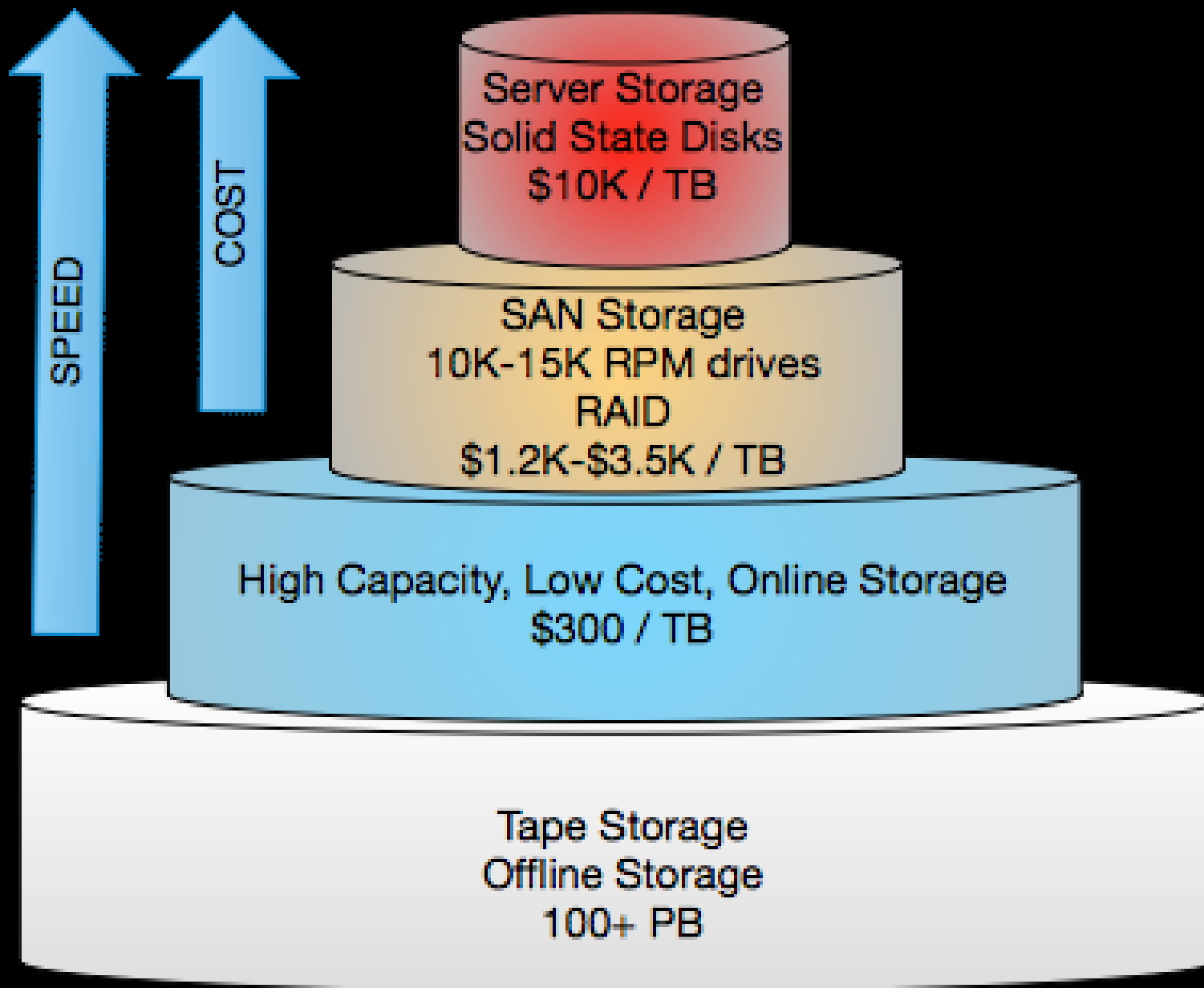


Software on commodity
hardware can replicate
costly vendor systems:
Software defined storage

Vendor storage: cost vs. budget vs. growth



Software defined storage



Storage Options & Cost

<u>Storage Type</u>	<u>Price/TB/Yr</u>	<u>Price/1.2PB/Yr</u>
Amazon S3 ⁽¹⁾⁽⁵⁾	\$829.59	\$995,512
Rackspace ⁽²⁾⁽⁵⁾	\$960.10	\$1,152,123
Duracloud Preservation ⁽³⁾⁽⁵⁾	\$1,000.63	\$1,200,750
Microsoft Azure ⁽⁴⁾⁽⁵⁾	\$829.59	\$995,512

(1) <http://aws.amazon.com/s3/pricing/>

(2) <http://www.rackspace.com/cloud/files/pricing/>

(3) <http://www.duracloud.org/pricing>

(4) <http://www.windowsazure.com/en-us/pricing/details/storage/>

(5) USD on a Tiered " Pay As You Go" Plan, data is geographically redundant



Storage Node

Commodity Hardware

- Off the shelf consumer grade disks
- Software Replication (3X)
- Fixity & Self healing
- Geographically distributed
- Scalable... HIGHLY Scalable!
- Object Storage

Block vs. Object Storage

Block Storage

- Traditional storage
- SCSI or ATA or iSCSI or FC
- Access data via OS
- “C:\`\\`” or “/dev/sda” or “Macintosh HD”
- Attached to one server at a time

Block vs. Object Storage

Object Storage

- Access data via HTTP
- GET, POST, DELETE
- Build applications using REST API

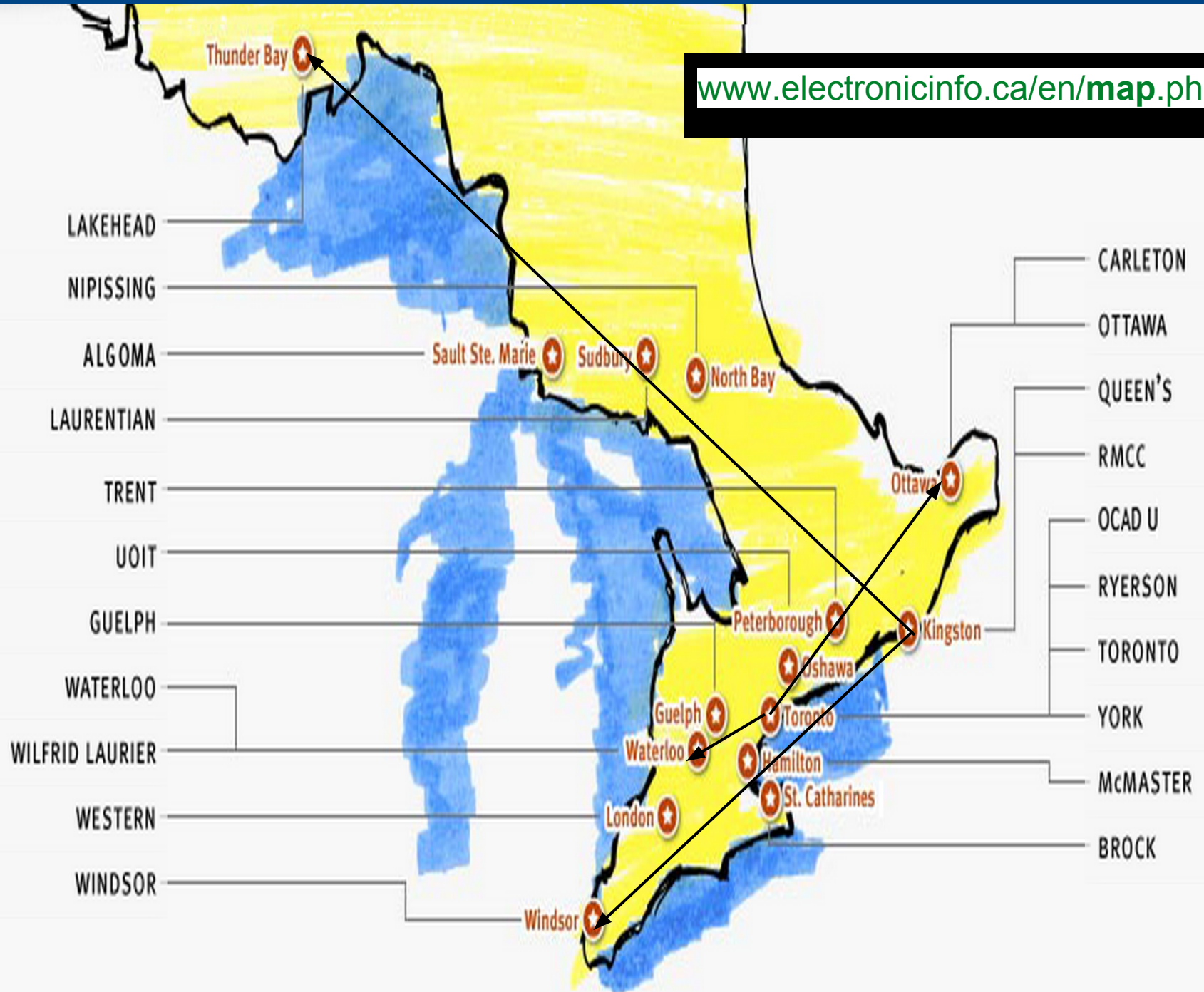
```
swift -A https://oculcloud/auth/v1.0 -U system:root -K testpass upload thumbnails dataverse/logo.png
```

```
swift -A https://oculcloud/auth/v1.0 -U system:root -K testpass upload myfiles dataverse/head_right.png
```

- Static content (PDFs, jpgs)
- All files have a URL

Cyberduck Demo

www.electronicinfo.ca/en/map.php



Storage Options & Cost

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OCUL ⁽⁶⁾	\$350	\$420,000

(1) <http://aws.amazon.com/s3/pricing/>

(2) <http://www.rackspace.com/cloud/files/pricing/>

(3) <http://www.duracloud.org/pricing>

(4) <http://www.windowsazure.com/en-us/pricing/details/storage/>

(5) USD on a Tiered " Pay As You Go" Plan, data is geographically redundant

(6) Includes cost of additional staff

So what?

Interesting because:

We're envisioning a solution that can help us out in a lot of different areas:

- Scholars Portal platforms
- Dataverse/other RDM initiatives
- Institutional Repositories
- New applications
- Just space in general!

with lots of different functional requirements:

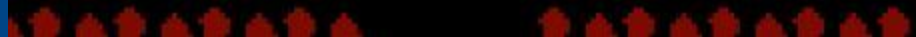
- Autonomic digital preservation activities
- Lots of different interfaces
- Integration with HPC centers

Important because:

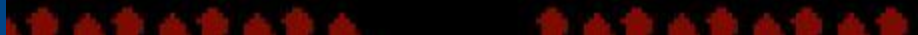
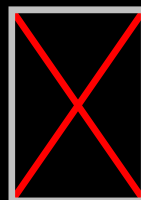
- Cost
- Jurisdiction
- Self-sufficiency

**Which brings us to the
point....**

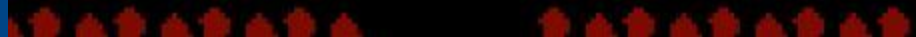
IT'S DANGEROUS TO GO
ALONE! TAKE THIS.



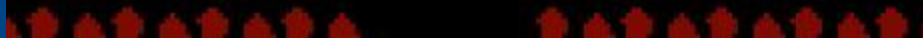
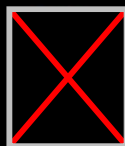
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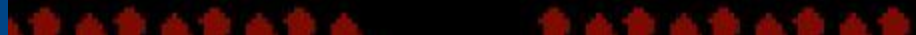
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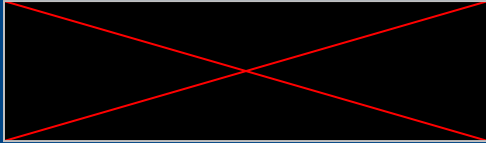
IT'S DANGEROUS TO GO
ALONE! TAKE THIS.



IT'S DANGEROUS TO GO
ALONE! TAKE THIS.



If it's worth doing here....



.....it's worth doing here!



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