# **CloudStor** Getting out of the way of researchers

**David Jericho, Solutions Architect, AARNet** 

## Who is AARNet?

- Australian Academic and Research Network
- 38 universities and CSIRC
- Hundreds of
  - schools
  - galleries
  - libraries
  - museums
  - research centres
  - vocational training sites
- Own and run our own national fibre infrastructure





## Australian Population Density





IDE 3 - COPYRIGHT 201

#### AARNet Global Reach





### Australian Population Density Redux

- Geographic size of Brazil, with 10% of the population
- Can fit all of continental Europe inside Australia
- 90ms between extremes of the national network
- Australian researchers travel extensively
- New Zealand use our services too

## AARNet's Sync, Share and Transfer

- Named CloudStor
- ownCloud 8.1 based
   Also providing FileSender
- Total Users over Time
- 17,086 researchers with 100GB quota as on 8<sup>th</sup> Feb 2016
  - 50% of Australian researchers via word of mouth
- 190 institutional identities present
- It's a concept, not an execution



## OpenCloudMesh

- Researchers share in the least expected ways
- Millions of R&E and students reachable
- Get on board, we're about including your system
- We do the heavy lifting because users can't





## 24 hours of CloudStor





#### That really is a bison genetics researcher in Mongolia

## More on Why



- The DropBox problem
  - No control of the data
  - Sovereignty problems
- The CDN problem
  - Providing a way for people to distribute content
- The large data problem
  - Not everybody has big files
    - Most have a lot of small files that they care about
  - We do the heavy lifting

### CloudStor Really Is...

- We position ourselves as:
  - The data pump
  - The ad-hoc data storage site
  - The middleware for researcher workflow

- We love
  - We actually celebrate moving data of all sizes
     ... we won't block accounts because someone used it
  - Finding out what weird and wonderful research we're helping
  - Tooling things up to meet the needs of our users



#### Because We Like To Help

- Researchers shouldn't have to be IT experts
  - And they shouldn't have to be
- Do what you're good at
  - Let us do what we're good at



### The Design Problem

- Highly IT focused people looking in
  - We don't know the disciplines
- We need to be told
  - Which brings us back to the things we love



## CERN's EOS in Australia For CloudStor

- True high performance single namespace at 65ms
- Data in and out per client at tens of Gbps
- Most scalable solution found after failing with many
   We keep taking about a paper on failing storage on WANs
- ...and it offers a filesystem for old tools to interact with
- ...and it scales to hundreds of petabytes readily

## Ongoing Experiments with CERN



#### **R&D - EOS World-Wide Deployment**

Norwegian Sco	Security Makes	TY ST IN	
weight and the second s	in the second		State Construction of Construction
Reskard the Adapt Reskard			
And	In Paters	a state of the set of the set	and the second second
The second secon	ngen, fremen Regel, anno Regel anno, References	Mar 1 2 in	
Marine State	Comm frei		A grant of a
network Kontroller and Antonio	Name and hours and hours	the second of the second secon	Ber
General Declaration of Allower Statement Control of Allower Statement Cont	Yekatemburg him him him Anton Butchings him     Challenge him	and Kinneyask	Sea of Oklassik
Studie Manch Starting St. Bank Uld Manay an Steam Starting Startin	Continued Force and Force and Force and Force	Trong the property of the prop	The pair of the second se
Perhanella Production Provide State	County of Astant and Astant	And a series and a	And the second s
Partie Pa	Despectant Destant and server and server Despectant Kirs and server and server	And the Annual Date of Annual Annua	
CERN- CERN-	annung internet annung	A REAL PROPERTY AND A REAL	Participant Provide Pr
La Conna Bibus Sin Solawan e France Solawan and Solawa	raam Droncel - Bishigk - Erne	and the second se	Sapporo Sapano
Central Middle Servekine an Nerri Serve Program Server Serve	Taskent" Lag	Bacton Ba	Anne Harry Backs Pacific
CODE A VICTOR DUE CON CASING A SALE AND A SA	Same sail, Jackton	And a series of the series of	Anone a Carlos Anone
Rand Contrary - Anno 1999 - Contrary - Anno 1999 - Contrary - Anno 1999 - Contrary - Barry - Contrary - Barry - Contrary - Barry - Contrary - Contry - Contry - Contr	And States of the States of th	And Andrew Andre	Charles Tokyo
Annual and Date of the Date of	Con Gove Earstabed "Lastrens"	Charge vitar starts for test of the start of	My szak
Agent and All Domains All Doma	Abote Later Dealer Octour Kanpur Patrice P	Annual Sector	
Anne war we wanted	Antheodobac Bruged unsitial Kolecta	Children Constanting Constanting States	SGC
Mariaketer and Take yes Mally young Contact Textures and State And	Venue Lie Nogels Cobs	Street and Charles and Charles and Charles Loog City	
Date - Date - State -	Hoter Hall Brain Baishmundry Hall Makes	Baserie Units Viertible Da Nary Sea San Cata Nation Sea Bangkol Cata Sea Chypeon Mr. 1	
Bargaria Bargaria Congedoragos Regeneral Antes Regeneral Part and	Kurdabel ul	burner Parcen Pola Carlas Cantas Carlos Carlos	Cam Ocean
[root@p05151113837349 ~]# eos ls -1 /eos/	Cation	Karline Kabita Turi Kabita Kab	New Ministra
Total Transmission Contraction Contraction and and and and the second se	1 Nov 05 12:13	starting and store and store and the store and	
	2 Sep 08 15:43		Sheet K1113213
	3 Sep 28 10:11		Mary Bary
	2 Sep 25 13:52		
	1 Oct 02 13:59	triplecopy	Honara N
[root@p05151113837349 ~]# eos ls -1 /eos/aus			and the second s
	1 Sep 25 13:52	melbourne	30/8
	3 Sep 08 15:43	proc -	Sim Calific Noumea
[root@p05151113837349 ~]# eos ls -l /eos/eur			Eristane
	0 Sep 25 13:52		
	0 Sep 25 13:52	geneva	Ingere Sydney Tasman Sea
[root@p05151113837349 ~]# eos ls -l /eos/asi	ia		And Canberra Consult Cancers
drwxrwsr-+ 1 daemon root	0 Nov 05 12:13	taiwan 🔥 \Lambda 🗅	
[root@p05151113837349 ~]#			The Transferrer Brenned Comment
			Zalated remain Provide



## Deployments by Quarter 2

- Beta of integration with VicNode's OpenStack volumes
   Tests have shown 36Gbps ingest at 2,000 km
- AARNet branded client
  - Free on Apple App Store and Google Play
- More storage
  - Ensuring we have both the capacity and IO to cope
  - Tripled user count in less than a year
    - And the requests keep coming

## The 2016 Roadmap

- CloudStor under the desk
  - Bringing data extremely close to the user
- CloudStor, er, in the Cloud
  - Containerised user space on OpenStack VM
  - Choose your own file transfer protocol
- CloudStor replicas in other countries

   True replication, by policy to remote sites
- Institutional administration and control



## The 2016 Roadmap 2



- Institutional publishing and archive integrations
  - Integrating ad-hoc use with archives and publishing
- Enabling additional protocols
  - Because this is about getting out of the way of the workflow
- Adding application integrations
  - Enabling users to flow their data between their instruments, the cloud, their supercomputers, and their laptop
- OpenCloudMesh
  - Heterogeneous cloud global sync, sharing and transfer

aarnet

## The 2016 Roadmap Beyond Thunderdome

- Service level agreements
  - For Site Reliability Engineering metrics
  - For customer comfort and assurances
- Compliance testing and certification
  - Government data
  - Medical data

## CloudStor: Getting Out of the Way

- Easier to connect
- Choose your own protocol
- Institutional control
- Sharing globally without tools
- On-demand global replication
- Making institutions happy