

Cloud Challenges

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Some of the high level ones

- End to end data integrity
- Vendor lock in
- Performance

- No standards for end-to-end protection
 - Standards needed from creation to deletion
 - There are some standards for parts of the path for disk and tape
- Vendor guarantees cannot be validated
 - What backs the vendor guarantee?
 - Money? Does that matter?
- System architects do not accept at face value what storage hardware vendors tell them
 - Why should anyone accept what cloud vendors tell them
 - Ronald Reagan said it best, “Trust but verify”

- How much will it cost you to get your data and move it to another vendor
 - Most vendors once they have your data will charge you an arm and a leg to get the data back quickly
 - Think Glacier
- Vendors want to control your data
 - I have a saying
 - Those who control the archive own “fill in the blank”
 - Big data solution
 - Control your own IP
 - Control your destiny

- Raise your hands
 - How many people have Less than OC-12 (Optical Carrier 622 Mbit/sec), OC-192 (9952 Mbit/sec), greater than
- Fun fact
 - OC-192 bandwidth is equal:
 - Less than the bandwidth of 8 enterprise 2.5 inch 15K disk drives
 - Less than the bandwidth of 3 enterprise SSDs
 - So how much I/O do you want and do you need to be successful?

Reliability 9s



HIGH PERFORMANCE INNOVATION

9s	Data Reliability %	Data Loss in Bytes				
		1 PiB	50 PiB	100 PiB	500 PiB	1 EiB
2	99%	11,258,999,068,426	562,949,953,421,312	1,125,899,906,842,620	5,629,499,534,213,120	11,529,215,046,068,500
3	99.9%	1,125,899,906,843	56,294,995,342,131	112,589,990,684,262	562,949,953,421,312	1,152,921,504,606,850
4	99.99%	112,589,990,684	5,629,499,534,213	11,258,999,068,425	56,294,995,342,125	115,292,150,460,672
5	99.999%	11,258,999,068	562,949,953,419	1,125,899,906,838	5,629,499,534,188	11,529,215,046,016
6	99.9999%	1,125,899,907	56,294,995,344	112,589,990,688	562,949,953,438	1,152,921,504,640
7	99.99999%	112,589,991	5,629,499,531	11,258,999,063	56,294,995,313	115,292,150,400
8	99.999999%	11,258,999	562,949,956	1,125,899,913	5,629,499,563	11,529,215,104
9	99.9999999%	1,125,900	56,294,994	112,589,988	562,949,938	1,152,921,472
10	99.99999999%	112,590	5,629,500	11,259,000	56,295,000	115,292,160
11	99.999999999%	11,259	562,950	1,125,900	5,629,500	11,529,216
12	99.9999999999%	1,126	56,294	112,588	562,938	1,152,896

- Clouds are a challenge for the data owners not the vendors
- The vendors have your data, make no contractual promises about returning it the way they got it, get paid every month, make it expensive and/or difficult to get your data back, are relatively slow compared to local storage
 - Pretty good deal is it not
- Each of us have the responsibility to make sure that what we do or what others do with our data makes long term sense