Clouds on your horizon?

Daniel A. Morgan | damorgan12c@gmail.com | www.morganslibrary.org

Daniel A. Morgan

Official Beta Site
ORACLE DATABASE 12c

- Oracle ACE Director
- Consultant to Harvard University
- University of Washington Oracle Instructor, ret.
- The Morgan of Morgan's Library on the web
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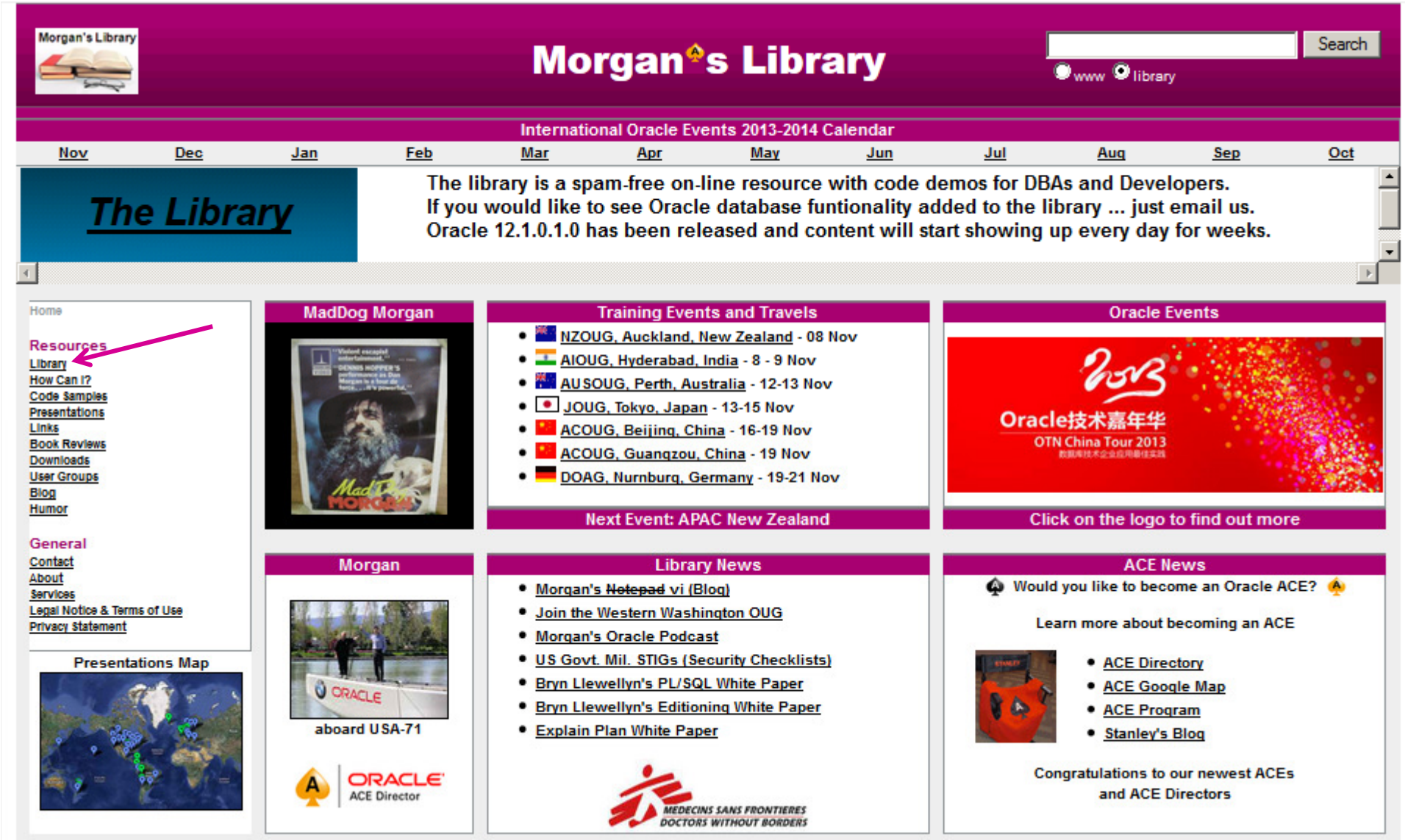
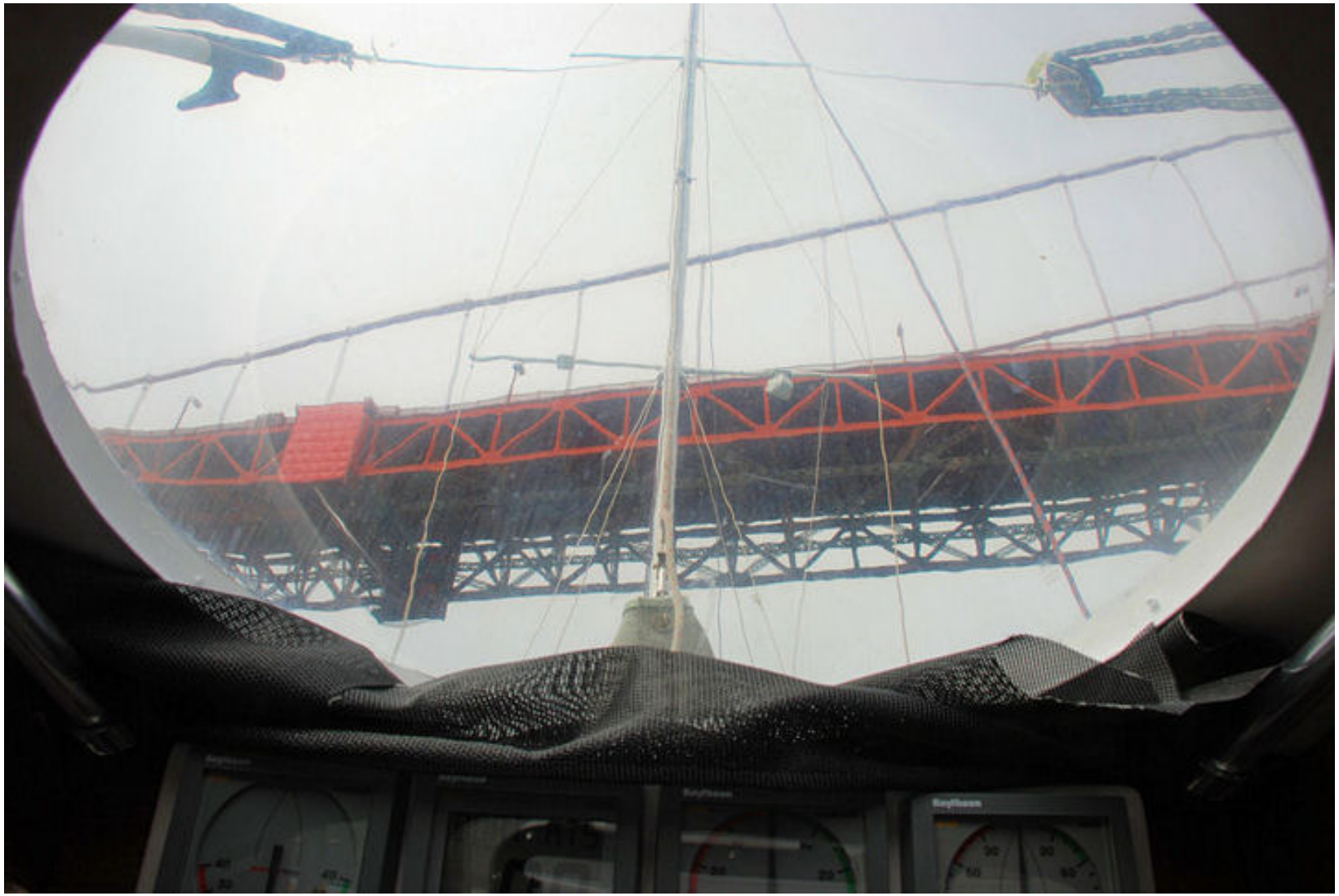


cd $MORGAN_BASE

cd $MORGAN_BASE/San_Francisco

In under the Golden Gate



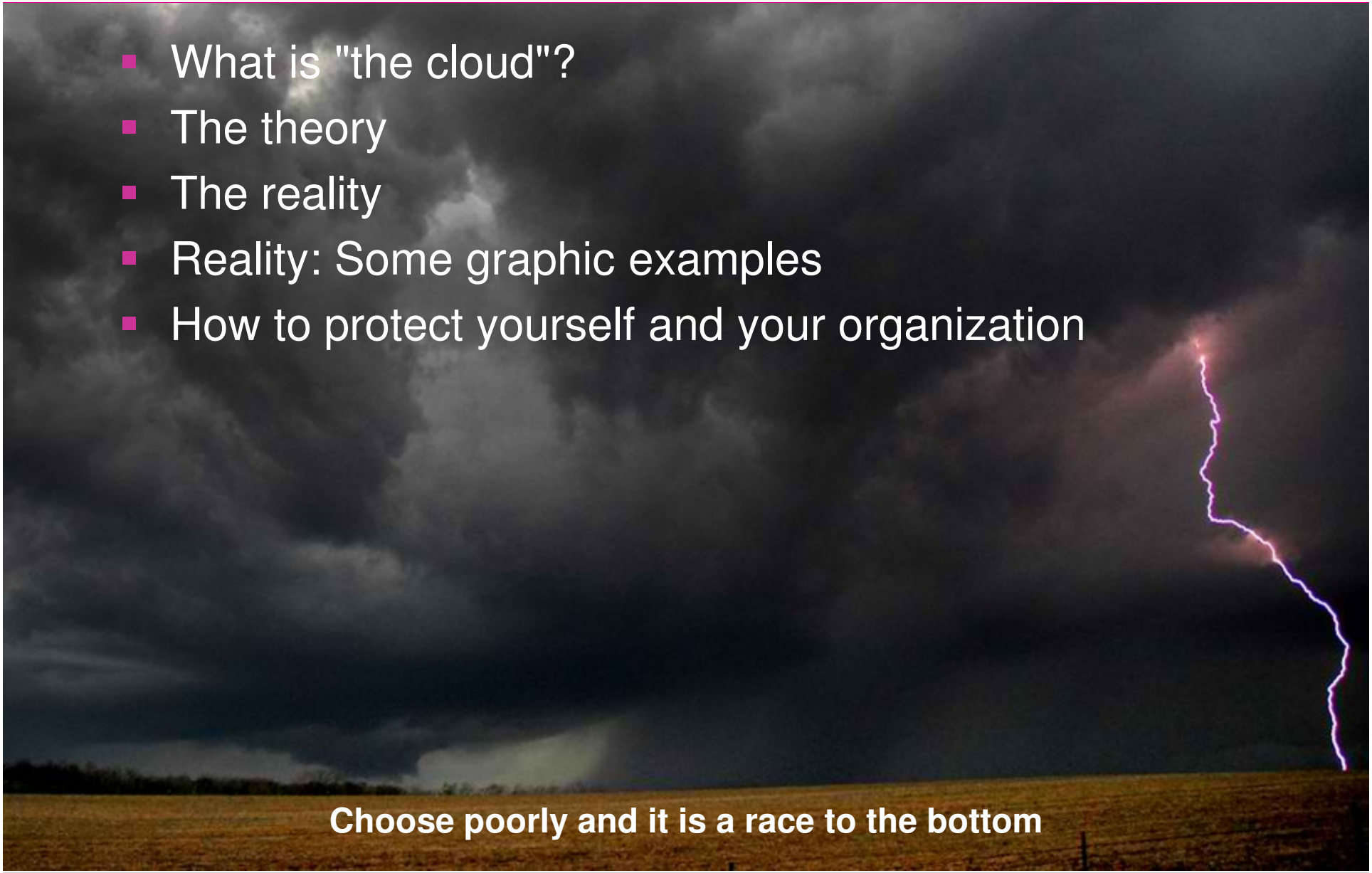
to San Francisco

To watched Larry's AC72 in practice

Clouds on your horizon?

One Take-Away

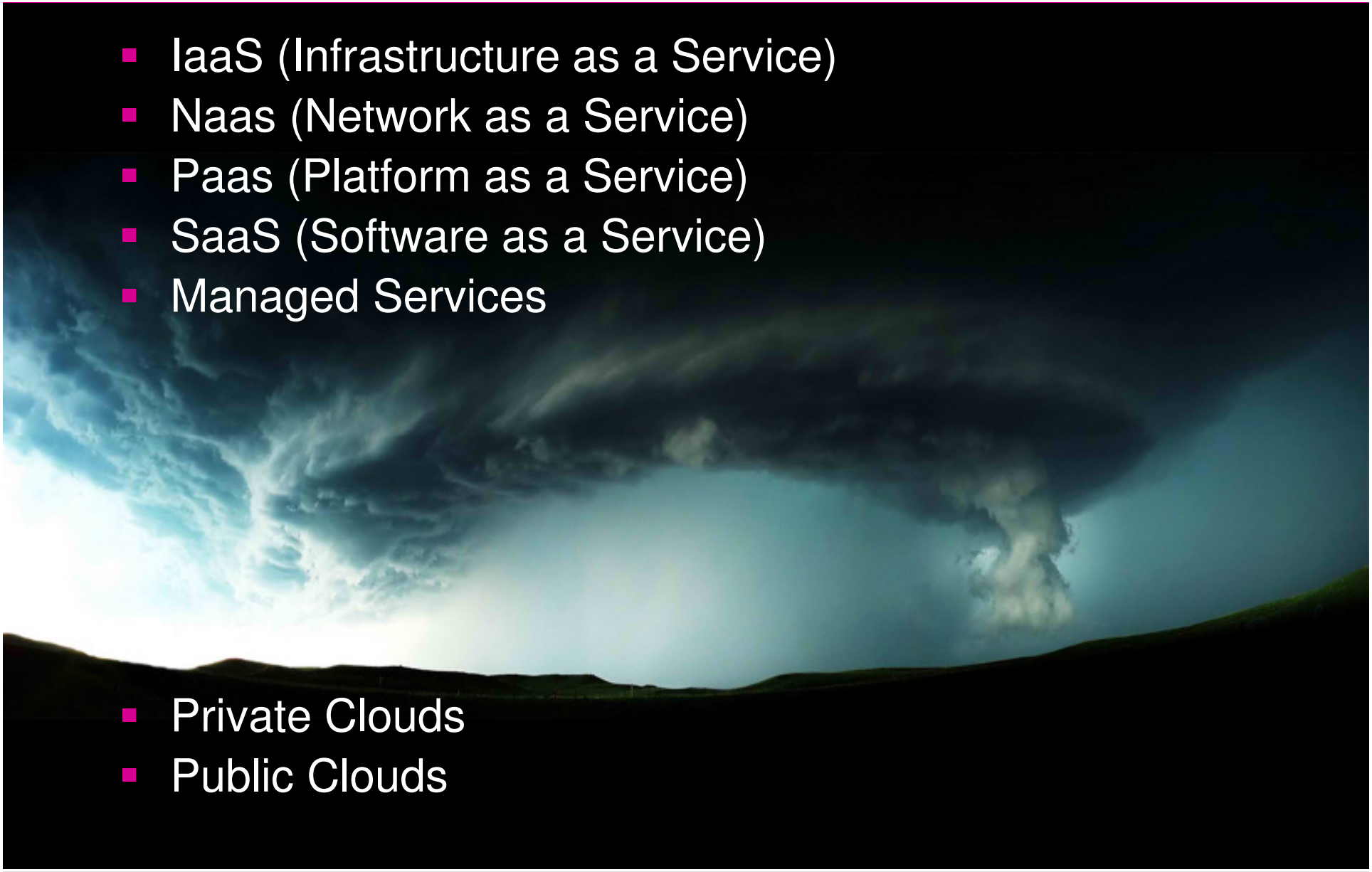
Syllabus


What is "the cloud"?
The theory
The reality
Reality: Some graphic examples
How to protect yourself and your organization
Choose poorly and it is a race to the bottom

Theory

Warning: The next set of slides are rated PG

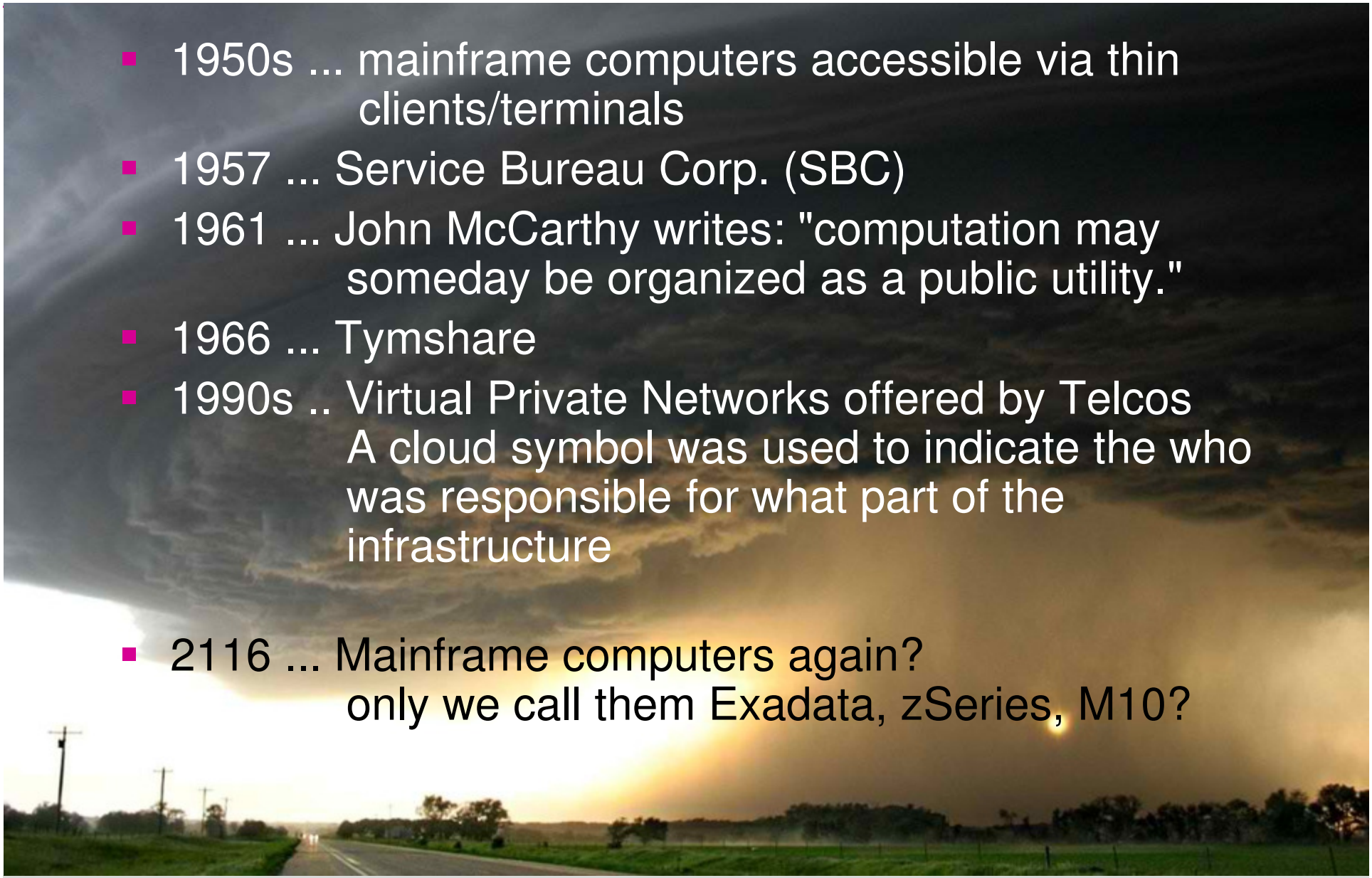
What is "the cloud?"



- IaaS (Infrastructure as a Service)
- Naas (Network as a Service)
- Paas (Platform as a Service)
- SaaS (Software as a Service)
- Managed Services

- Private Clouds
- Public Clouds

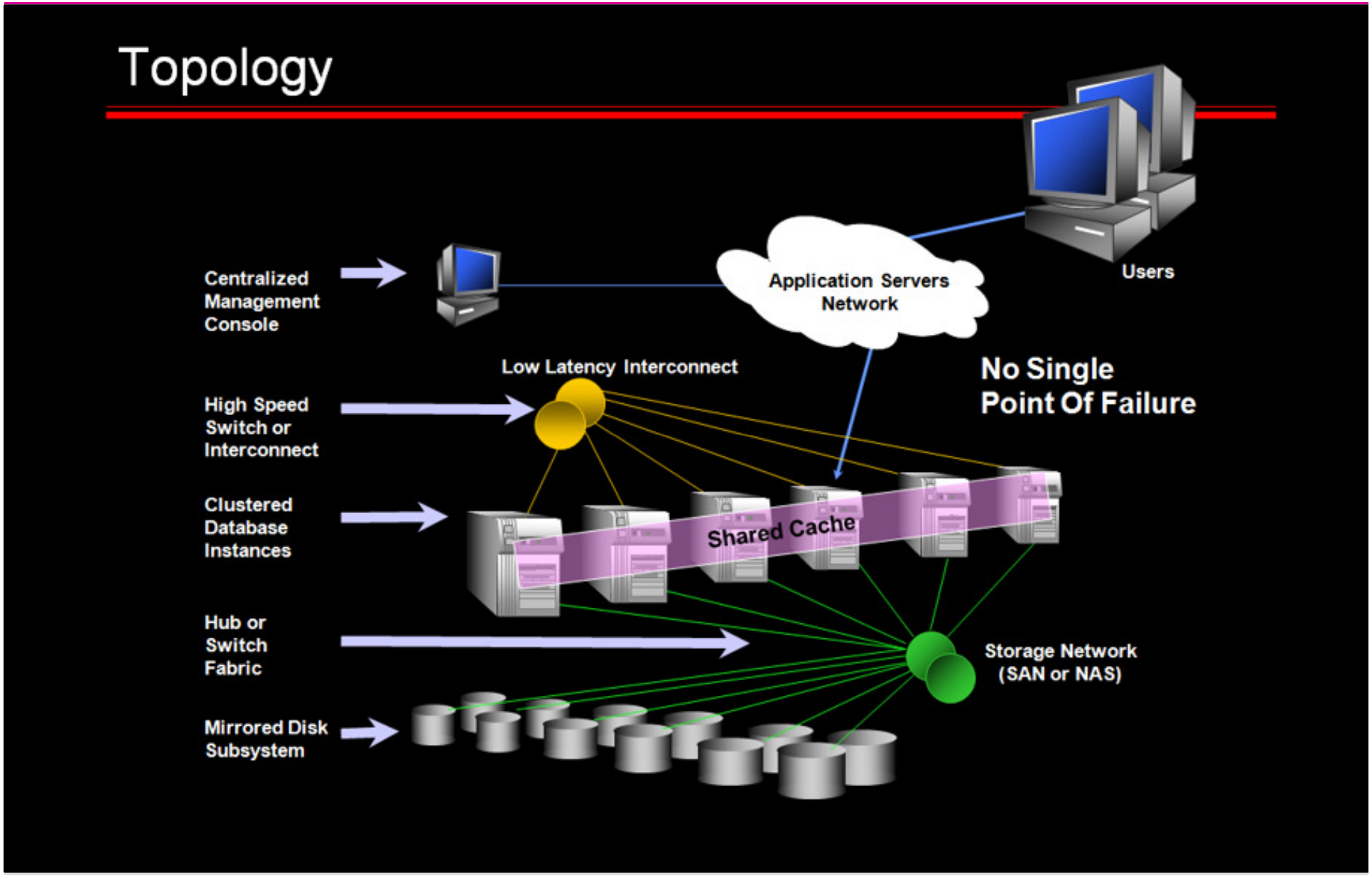
Cloud: The Theory



- 1950s ... mainframe computers accessible via thin clients/terminals
- 1957 ... Service Bureau Corp. (SBC)
- 1961 ... John McCarthy writes: "computation may someday be organized as a public utility."
- 1966 ... Tymshare
- 1990s .. Virtual Private Networks offered by Telcos
  A cloud symbol was used to indicate the who was responsible for what part of the infrastructure

- 2116 ... Mainframe computers again?
  only we call them Exadata, zSeries, M10?

Cloud: One of my 2006-7 presentation slides

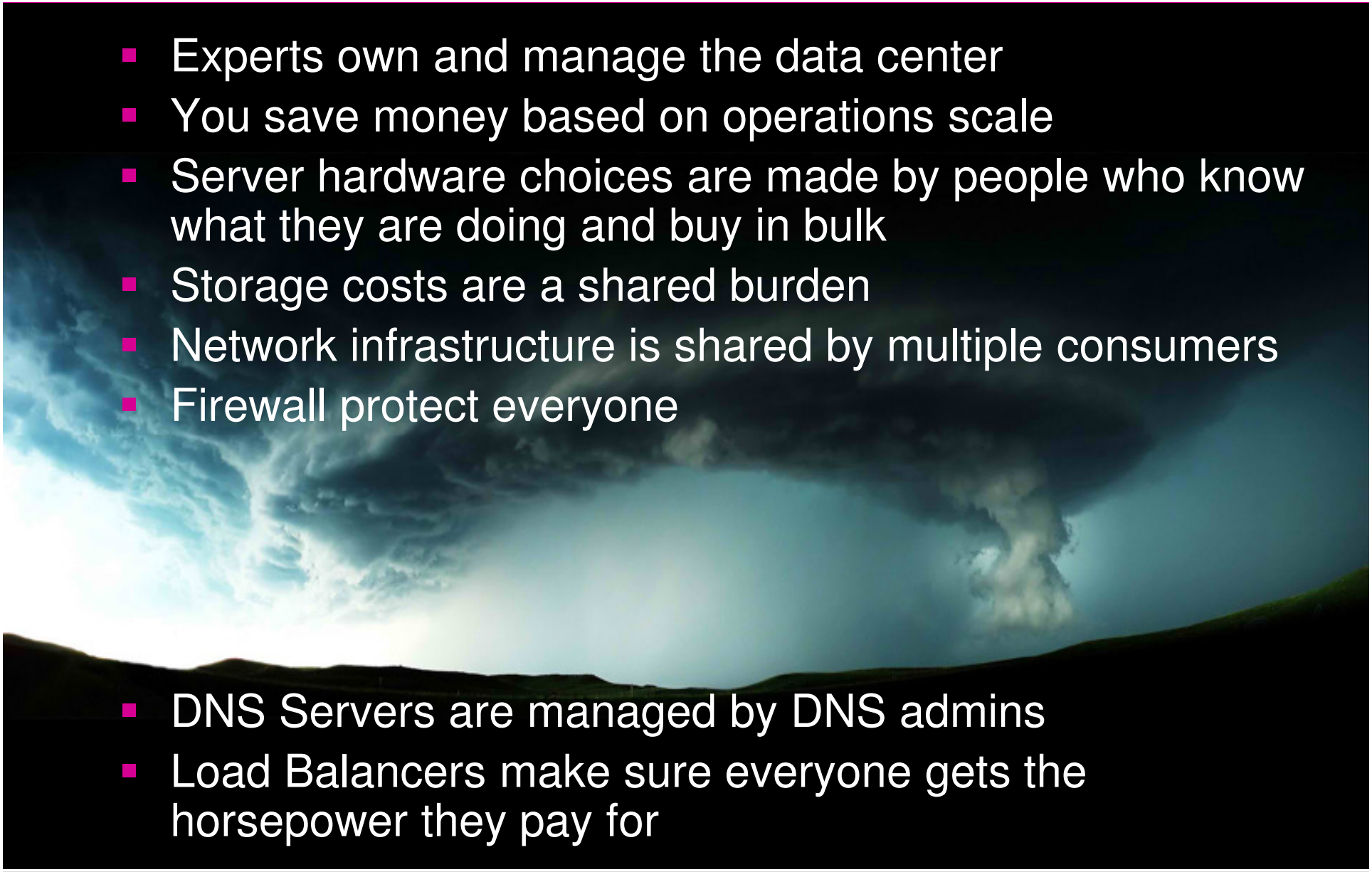


Cloud: The Theoretical Value

- Agility
- Common APIs
- Cost Sharing
- Device and Location Independence
- Migration
- Monitoring
- Multitenancy = Shared Burden

- On-Demand Self Service
- Security
- Utilization Improvement

Cloud: The Theoretical Value



- Experts own and manage the data center
- You save money based on operations scale
- Server hardware choices are made by people who know what they are doing and buy in bulk
- Storage costs are a shared burden
- Network infrastructure is shared by multiple consumers
- Firewall protect everyone

- DNS Servers are managed by DNS admins
- Load Balancers make sure everyone gets the horsepower they pay for

Reality

Warning: The next slide is rated R

Cloud: The Reality

- No standards and no definitions
- No portability: Almost total vendor lock-in
- No control over
  - infrastructure (servers, storage, network, firewall)
  - operating system versions
  - database versions
  - application and web server versions
  - patching and patching schedules
  - uptime (whatever that may be defined to mean)
- Are there financial savings?

Were you doing things well in the first place?

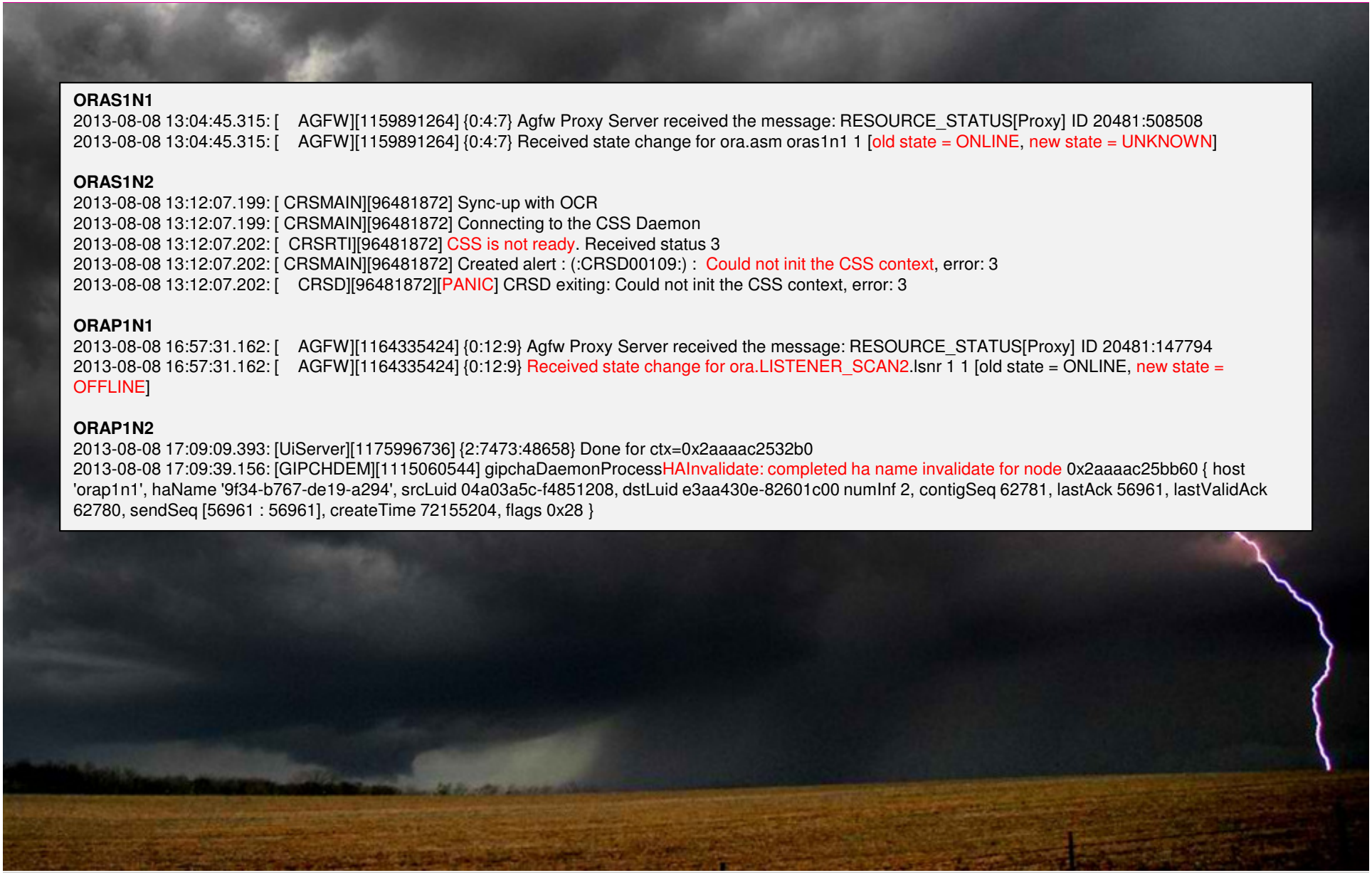
More Reality

Warning: The next set of slides are rated XXX

Dose of Reality #1

Configuration Management
The Cloud meets the Puppet

DC2 Outage: But Hours Earlier



ORAS1N1
2013-08-08 13:04:45.315: [AGFW][1159891264] {0:4:7} Agfw Proxy Server received the message: RESOURCE_STATUS[Proxy] ID 20481:508508
2013-08-08 13:04:45.315: [AGFW][1159891264] {0:4:7} Received state change for ora.asm oras1n1 1 [old state = ONLINE, new state = UNKNOWN]

ORAS1N2
2013-08-08 13:12:07.199: [CRSMAIN][96481872] Sync-up with OCR
2013-08-08 13:12:07.199: [CRSMAIN][96481872] Connecting to the CSS Daemon
2013-08-08 13:12:07.202: [CRSRTI][96481872] CSS is not ready. Received status 3
2013-08-08 13:12:07.202: [CRSMAIN][96481872] Created alert : (:CRSD00109:) : Could not init the CSS context, error: 3
2013-08-08 13:12:07.202: [CRSD][96481872][PANIC] CRSD exiting: Could not init the CSS context, error: 3

ORAP1N1
2013-08-08 16:57:31.162: [AGFW][1164335424] {0:12:9} Agfw Proxy Server received the message: RESOURCE_STATUS[Proxy] ID 20481:147794
2013-08-08 16:57:31.162: [AGFW][1164335424] {0:12:9} Received state change for ora.LISTENER_SCAN2.lsnr 1 1 [old state = ONLINE, new state = OFFLINE]

ORAP1N2
2013-08-08 17:09:09.393: [UiServer][1175996736] {2:7473:48658} Done for ctx=0x2aaaac2532b0
2013-08-08 17:09:39.156: [GIPCHDEM][1115060544] gipchaDaemonProcessHAInvalidate: completed ha name invalidate for node 0x2aaaac25bb60 { host 'orap1n1', haName '9f34-b767-de19-a294', srcLuid 04a03a5c-f4851208, dstLuid e3aa430e-82601c00 numInf 2, contigSeq 62781, lastAck 56961, lastValidAck 62780, sendSeq [56961 : 56961], createTime 72155204, flags 0x28 }

O/S Changes: DNS Changes

Aug 4 04:09:16 orap1n1 Updating DNS configuration for: orap1n1.ams2.sf.privAug 4 04:09:16 orap1n1 Initial DNS Server: 10.2.198.34Aug 4 04:09:16 orap1n1 Connecting to DNS server 10.2.198.34Aug 4 04:09:16 orap1n1 Connected to DNS server 10.2.198.34Aug 4 04:09:16 orap1n1 Updating both HOST and PTR record
for: orap1n1.ams2.sf.privAug 4 04:09:16 orap1n1 Deleting old reverse lookup records for orap1n1.ams2.sf.priv on 10.2.198.34.Aug 4 04:09:17 orap1n1 Adding GSS support to DNS server 10.2.198.34Aug 4 04:09:17 orap1n1 Added GSS support to DNS server 10.2.198.34Aug 4 04:09:17 orap1n1 Failed to delete reverse lookup record 11.78.2.10.in-addr.arpa. Reason Refused (5).Aug 4 04:09:17 orap1n1 Deleting reverse lookup records for our current new IP Address(s) on
ad010.ams2.sf.priv.Aug 4 04:09:18 orap1n1 No reverse lookup records found for 11.0.168.192.in-addr.arpa on ad010.ams2.sf.priv.Aug 4 04:09:18 orap1n1 No reverse lookup records found for 21.34.254.169.in-addr.arpa on ad010.ams2.sf.priv.Aug 4 04:09:19 orap1n1 No reverse lookup records found for 12.0.168.192.in-addr.arpa on ad010.ams2.sf.priv.Aug 4 04:09:20 orap1n1 No reverse lookup records found for 181.139.254.169.in-addr.arpa on ad010.ams2.sf.priv.Aug 4 04:09:20 orap1n1 Failed to delete reverse lookup record 11.78.2.10.in-addr.arpa. Reason Refused (5). Aug 4 04:09:21 orap1n1 Failed to delete reverse lookup record 10.78.2.10.in-addr.arpa. Reason Refused (5).Aug 4 04:09:22 orap1n1 Failed to delete reverse lookup record 102.78.2.10.in-addr.arpa. Reason Refused (5).Aug 4 04:09:22 orap1n1 Failed to delete reverse lookup record 100.78.2.10.in-addr.arpa. Reason Refused (5).Aug 4 04:09:23 orap1n1 Failed to delete reverse lookup record 14.2.2.10.in-addr.arpa. Reason Refused (5).Aug 4 04:09:23 orap1n1 Deleting host records for orap1n1.ams2.sf.priv on ad010.ams2.sf.priv.Aug 4 04:09:23 orap1n1 Failed to delete host record for orap1n1.ams2.sf.priv. Reason Refused (5).

Aug 10 12:03:23 orap1n1 Updating DNS configuration for: orap1n1.ams2.sf.privAug 10 12:03:23 orap1n1 Initial DNS Server: 10.2.198.33Aug 10 12:03:23 orap1n1 Connecting to DNS server 10.2.198.33Aug 10 12:03:23 orap1n1 Connected to DNS server 10.2.198.33Aug 10 12:03:24 orap1n1 Updating both HOST and PTR record for: orap1n1.ams2.sf.privAug 10 12:03:24 orap1n1 Deleting old reverse lookup records for orap1n1.ams2.sf.priv on 10.2.198.33.Aug 10 12:03:24 orap1n1 Adding GSS support to DNS server 10.2.198.33Aug 10 12:03:24 orap1n1 Added GSS support to DNS server 10.2.198.33Aug 10 12:03:25 orap1n1 Failed to delete reverse lookup record 11.78.2.10.in-addr.arpa. Reason Refused (5).Aug 10 12:03:25 orap1n1 Deleting reverse lookup records for our current new IP Address(s) on ad009.ams2.sf.priv.Aug 10 12:03:25 orap1n1 No reverse lookup records found for 11.0.168.192.in-addr.arpa on ad009.ams2.sf.priv.Aug 10 12:03:26 orap1n1 No reverse lookup records found for 21.34.254.169.in-addr.arpa on ad009.ams2.sf.priv.Aug 10 12:03:27 orap1n1 No reverse lookup records found for 12.0.168.192.in-addr.arpa on ad009.ams2.sf.priv.Aug 10 12:03:27 orap1n1 No reverse lookup records found for 181.139.254.169.in-addr.arpa on ad009.ams2.sf.priv.Aug 10 12:03:28 orap1n1 Failed to delete reverse lookup record 11.78.2.10.in-addr.arpa. Reason Refused (5).Aug 10 12:03:28 orap1n1 Failed to delete reverse lookup record 10.78.2.10.in-addr.arpa. Reason Refused (5).Aug 10 12:03:29 orap1n1 Failed to delete reverse lookup record 101.78.2.10.in-addr.arpa. Reason Refused (5).Aug 10 12:03:30 orap1n1 Failed to delete reverse lookup record 14.2.2.10.in-addr.arpa. Reason Refused (5).Aug 10 12:03:30 orap1n1 Deleting host records for orap1n1.ams2.sf.priv on ad009.ams2.sf.priv.Aug 10 12:03:30 orap1n1 Failed to delete host record for orap1n1.ams2.sf.priv. Reason Refused (5).Aug 10 12:03:30 orap1n1 Updating host records for orap1n1.ams2.sf.priv on ad009.ams2.sf.priv.Aug 10 12:03:31 orap1n1 Failed to update host records orap1n1.ams2.sf.priv: Reason Refused (5).

7,824 lines of changes in /var/log/messages on one server
This happened 152 times on one server , in DC2, in 6 days

O/S Changes: Ruby?

Aug 8 13:04:22 orap1n1 ERROR: While executing gem ... (Gem::RemoteFetcher::FetchError)Aug 8 13:04:22 orap1n1 Errno::ETIMEDOUT: Connection timed out - connect(2) (http://rubygems.org/latest_specs.4.8.gz)Aug 8 13:04:22 orap1n1 INFO: `gem install -y` is now default and will be removed
Aug 8 13:04:22 orap1n1 INFO: use --ignore-dependencies to install only the gems you list

Aug 8 15:42:41 orap1n1 ERROR: While executing gem ... (Gem::RemoteFetcher::FetchError)Aug 8 15:42:41 orap1n1 Errno::ETIMEDOUT: Connection timed out - connect(2) (http://rubygems.org/latest_specs.4.8.gz)Aug 8 15:42:41 orap1n1 INFO: `gem install -y` is now default and will be removed
Aug 8 15:42:41 orap1n1 INFO: use --ignore-dependencies to install only the gems you list

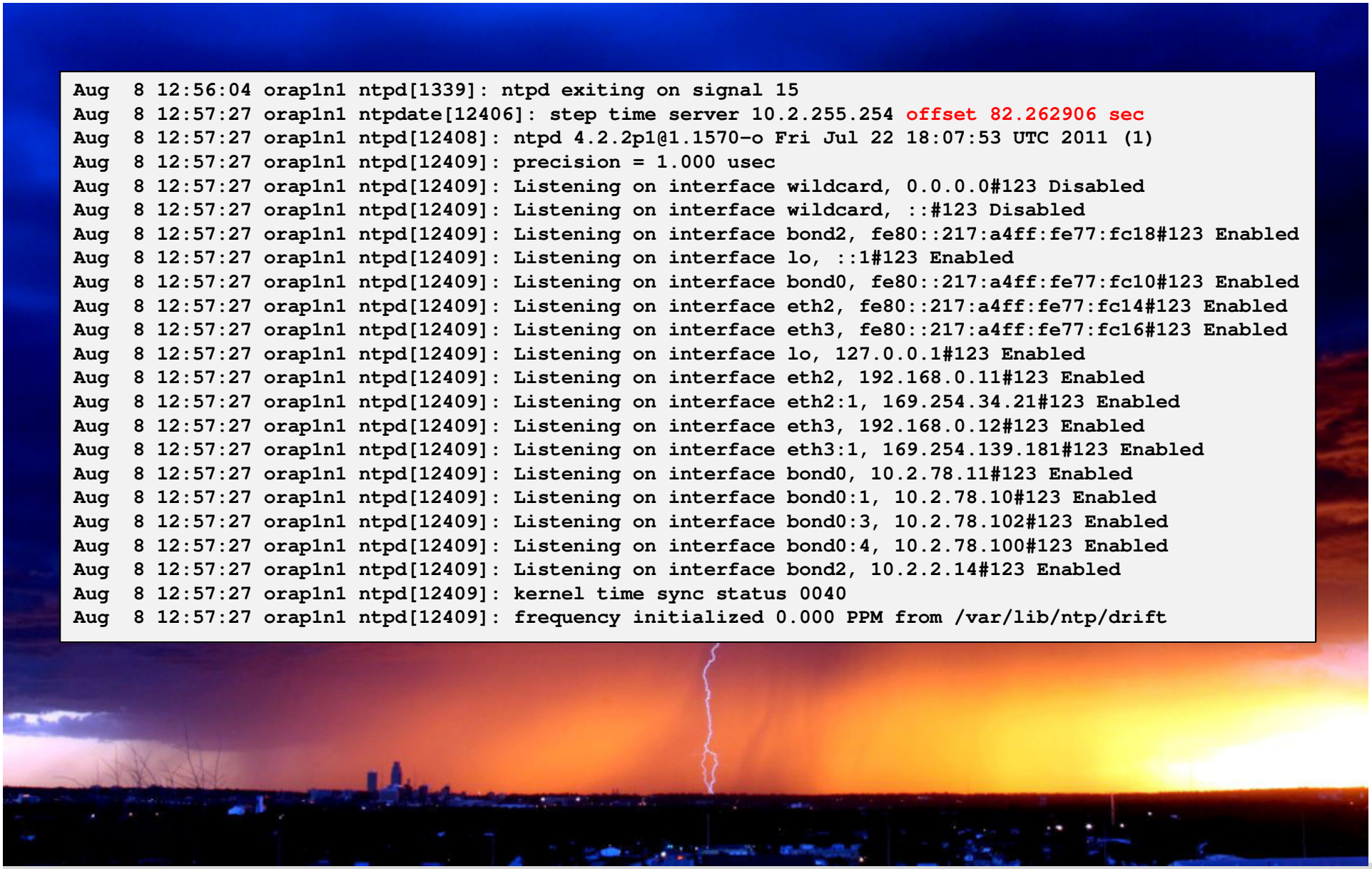
This happened twice just before the outage: Note the first time above 13:04:22 and the first indication of an issue 23 seconds later

ORAS1N1
2013-08-08 13:04:45.315: [AGFW][1159891264] {0:4:7} Agfw Proxy Server received the message: RESOURCE_STATUS[Proxy] ID 20481:508508

2013-08-08 13:04:45.315: [AGFW][1159891264] {0:4:7} Received state change for ora.asm oras1n1 1 [old state = ONLINE, new state = UNKNOWN]

O/S Changes: NTP Time Synchronization

```
Aug  8 12:56:04 orap1n1 ntpd[1339]: ntpd exiting on signal 15
Aug  8 12:57:27 orap1n1 ntpdate[12406]: step time server 10.2.255.254 offset 82.262906 sec
Aug  8 12:57:27 orap1n1 ntpd[12408]: ntpd 4.2.2p1@1.1570-o Fri Jul 22 18:07:53 UTC 2011 (1)
Aug  8 12:57:27 orap1n1 ntpd[12409]: precision = 1.000 usec
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface wildcard, 0.0.0.0#123 Disabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface wildcard, ::#123 Disabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface bond2, fe80::217:a4ff:fe77:fc18#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface lo, ::1#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface bond0, fe80::217:a4ff:fe77:fc10#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface eth2, fe80::217:a4ff:fe77:fc14#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface eth3, fe80::217:a4ff:fe77:fc16#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface lo, 127.0.0.1#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface eth2, 192.168.0.11#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface eth2:1, 169.254.34.21#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface eth3, 192.168.0.12#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface eth3:1, 169.254.139.181#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface bond0, 10.2.78.11#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface bond0:1, 10.2.78.10#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface bond0:3, 10.2.78.102#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface bond0:4, 10.2.78.100#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: Listening on interface bond2, 10.2.2.14#123 Enabled
Aug  8 12:57:27 orap1n1 ntpd[12409]: kernel time sync status 0040
Aug  8 12:57:27 orap1n1 ntpd[12409]: frequency initialized 0.000 PPM from /var/lib/ntp/drift
```



Dose of Reality #2

If you can't see it ... it can hurt you

Unobserved Job Failure

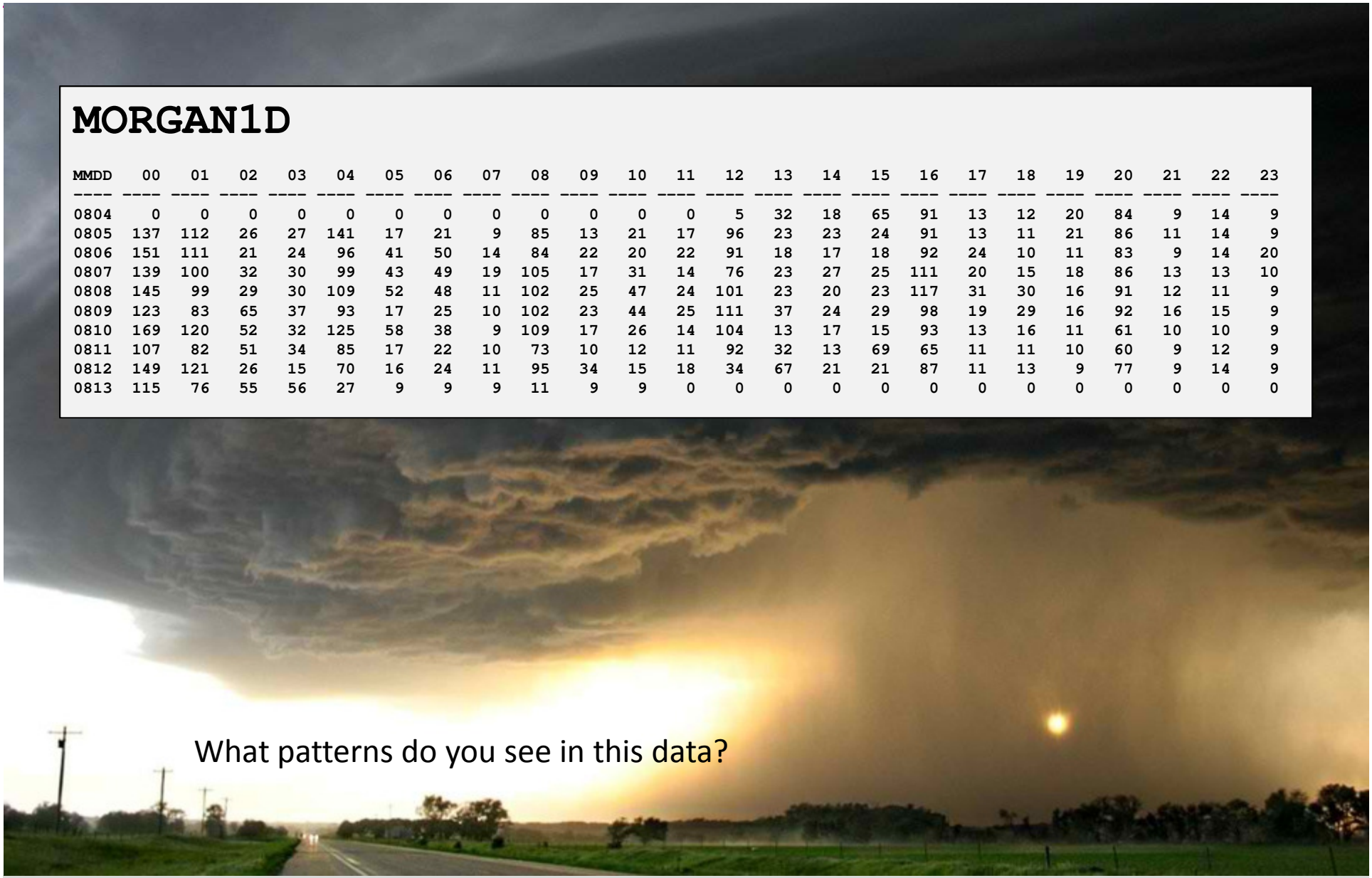
```
1  select owner, job_name, job_type, trunc(start_date) SDATE, trunc(next_run_date) nxtrun, failure_count
2  from dba_scheduler_jobs
3* where failure_count <> 0;

   OWNER           JOB_NAME                       STATE      SDATE               NXTRUN              FAILURE_COUNT
--------------- ------------------------------ ---------- ------------------- ------------------- -------------
SYS             SM$CLEAN_AUTO_SPLIT_MERGE      SCHEDULED  14-MAR-2011 00:00:00 14-AUG-2013 00:00:00            17
SYS             RSE$CLEAN_RECOVERABLE_SCRIPT   SCHEDULED  14-MAR-2011 00:00:00 14-AUG-2013 00:00:00            20
SYS             DRA_REEVALUATE_OPEN_FAILURES   SCHEDULED                                                       10
ORACLE_OCM      MGMT_CONFIG_JOB                SCHEDULED                                                        4
EXFSYS          RLM$SCHDNEGACTION              SCHEDULED  13-AUG-2013 00:00:00 13-AUG-2013 00:00:00             3
EXFSYS          RLM$EVTCLEANUP                 SCHEDULED  27-APR-2011 00:00:00 13-AUG-2013 00:00:00             2
RDBA5           LONG_RUN_SESS_JOB              SCHEDULED  12-AUG-2013 00:00:00 13-AUG-2013 00:00:00             1
XISAY_PROD      POPULATE_CATALOG               DISABLED   01-JUN-2009 00:00:00 08-AUG-2013 00:00:00          2559
```

Dose of Reality #3

If you can't see it it can hurt you

... and everybody else too

Repeating Issue: Unannounced Loads

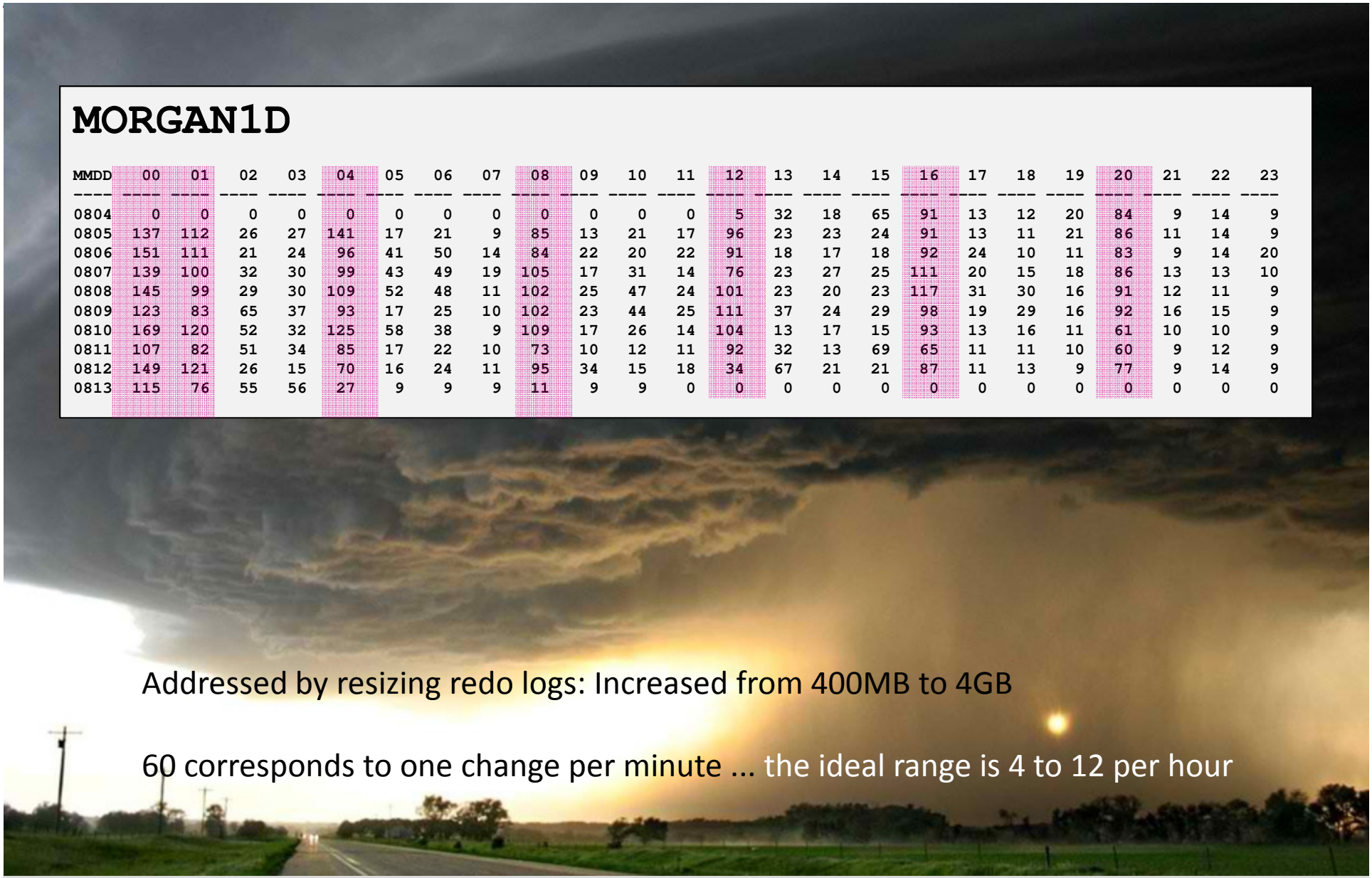


MORGAN1D

MMDD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0804	0	0	0	0	0	0	0	0	0	0	0	0	5	32	18	65	91	13	12	20	84	9	14	9
0805	137	112	26	27	141	17	21	9	85	13	21	17	96	23	23	24	91	13	11	21	86	11	14	9
0806	151	111	21	24	96	41	50	14	84	22	20	22	91	18	17	18	92	24	10	11	83	9	14	20
0807	139	100	32	30	99	43	49	19	105	17	31	14	76	23	27	25	111	20	15	18	86	13	13	10
0808	145	99	29	30	109	52	48	11	102	25	47	24	101	23	20	23	117	31	30	16	91	12	11	9
0809	123	83	65	37	93	17	25	10	102	23	44	25	111	37	24	29	98	19	29	16	92	16	15	9
0810	169	120	52	32	125	58	38	9	109	17	26	14	104	13	17	15	93	13	16	11	61	10	10	9
0811	107	82	51	34	85	17	22	10	73	10	12	11	92	32	13	69	65	11	11	10	60	9	12	9
0812	149	121	26	15	70	16	24	11	95	34	15	18	34	67	21	21	87	11	13	9	77	9	14	9
0813	115	76	55	56	27	9	9	9	11	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0

What patterns do you see in this data?

Repeating Issue: Unannounced Loads



MORGAN1D

MMDD	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0804	0	0	0	0	0	0	0	0	0	0	0	0	5	32	18	65	91	13	12	20	84	9	14	9
0805	137	112	26	27	141	17	21	9	85	13	21	17	96	23	23	24	91	13	11	21	86	11	14	9
0806	151	111	21	24	96	41	50	14	84	22	20	22	91	18	17	18	92	24	10	11	83	9	14	20
0807	139	100	32	30	99	43	49	19	105	17	31	14	76	23	27	25	111	20	15	18	86	13	13	10
0808	145	99	29	30	109	52	48	11	102	25	47	24	101	23	20	23	117	31	30	16	91	12	11	9
0809	123	83	65	37	93	17	25	10	102	23	44	25	111	37	24	29	98	19	29	16	92	16	15	9
0810	169	120	52	32	125	58	38	9	109	17	26	14	104	13	17	15	93	13	16	11	61	10	10	9
0811	107	82	51	34	85	17	22	10	73	10	12	11	92	32	13	69	65	11	11	10	60	9	12	9
0812	149	121	26	15	70	16	24	11	95	34	15	18	34	67	21	21	87	11	13	9	77	9	14	9
0813	115	76	55	56	27	9	9	9	11	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0

Addressed by resizing redo logs: Increased from 400MB to 4GB

60 corresponds to one change per minute ... the ideal range is 4 to 12 per hour

Self-Protection

Warning: The next set of slides are rated G

Questions You Need To Ask

- How is uptime defined?
- When the vendor says we guarantee 99.9% availability what does that mean?

Availability %	Downtime per year	Downtime per month*	Downtime per week
90% ("one nine")	36.5 days	72 hours	16.8 hours
95%	18.25 days	36 hours	8.4 hours
97%	10.96 days	21.6 hours	5.04 hours
98%	7.30 days	14.4 hours	3.36 hours
99% ("two nines")	3.65 days	7.20 hours	1.68 hours
99.5%	1.83 days	3.60 hours	50.4 minutes
99.8%	17.52 hours	86.23 minutes	20.16 minutes
99.9% ("three nines")	8.76 hours	43.8 minutes	10.1 minutes
99.95%	4.38 hours	21.56 minutes	5.04 minutes
99.99% ("four nines")	52.56 minutes	4.32 minutes	1.01 minutes
99.999% ("five nines")	5.26 minutes	25.9 seconds	6.05 seconds
99.9999% ("six nines")	31.5 seconds	2.59 seconds	0.605 seconds
99.99999% ("seven nines")	3.15 seconds	0.259 seconds	0.0605 seconds

source: wikipedia

- If it is "highly available" that must include maintenance

Questions You Need To Ask

- Security
  - What protections is in place to control access and prevent theft?
  - How are the controls implemented?
  - What independent organization has audited the controls?
  - Are audit trails arecreated? By what activities?
  - Who reviews the audit trails?
    - How often?
    - Show us an audit trail
    - How many employees or contractors have been warned/terminated in the last 2 years for policy violations?
  - If data is accessed do you know by who, when, and what they saw? Show us a typical report
  - If data was stolen how do you know what was taken?
  - How long after a breach will we be notified in writing with the details?
  - When was the last time someone tried to break into your systems?

Questions You Need To Ask

- Backup and Recover
  - To what hardware do you perform backups?
  - At what point in the process is a backup encrypted?
  - Who has the keys for decryption?
    - What happens if that person catches the flu?
  - How does the backup get off-site to a secure location?
  - How often are backup tapes/storage recycled?
  - Do the answers make sense to an independent senior consultant hired to protect your organization?

Questions You Need To Ask

- Disaster Recovery
  - What mechanisms do you have available in the event that there is a loss of the data center in which our applications are running?
  - Are there systems onto which we can failover real-time?
  - Is the failover to identical hardware with identical infrastructure?
  - When was the last time they live-tested the DR solution?

Questions You Need To Ask

- Change Management
  - How is the configuration of your servers documented?
  - What is the process for initiating configuration changes?
  - What change threshold must be reached before customers are notified?
    - Modify a configuration parameter?
    - Patch software?
    - Upgrade software version?
    - Change firewall and network hardware?
    - Replace storage array?
    - Replace physical server(s)?
  - What is the frequency of patching for O/S, database, application servers, web servers?
  - Ask to view one day of change management logs and do so with an independent senior consultant hired to protect your organization

Questions You Need To Ask

- Personnel
  - How many dedicated network admins do you employ?
  - Do you have a dedicated DNS administrator do you employ?
  - How many dedicated storage admins do you employ?
  - How many database admins do you employ?
  - How many web server admins do you employ?
  - How many of these admins are direct employees and how many are contractors?
  - How many of these admins are physically located in North America or Western Europe?
    - If off-shore what is the distribution, per shift, 7x24x365 of L1, L2, and L3+ resources?
  - How do you keep these admins' skills up to date?
    - What is the annual training budget per person?

Questions You Need To Ask

- Infrastructure
  - How many NTP servers are in the data center?
  - How many DNS servers are in the data center?
  - How are these assets configured and maintained?
  - Do these answers make sense to an independent senior consultant hire to protect your interests?

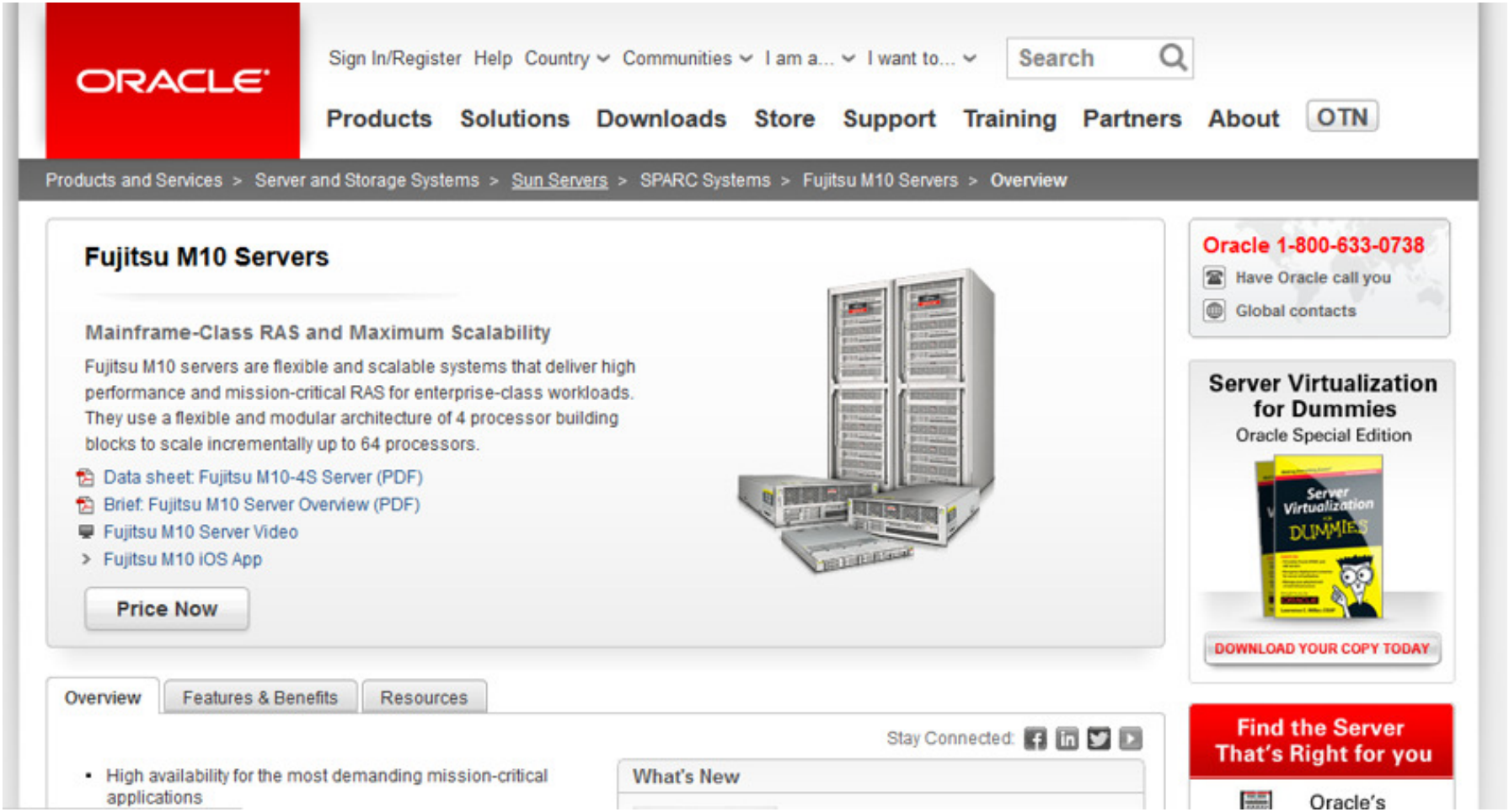
Conclusion

Warning: The next slides are rated G

How To Go It Alone

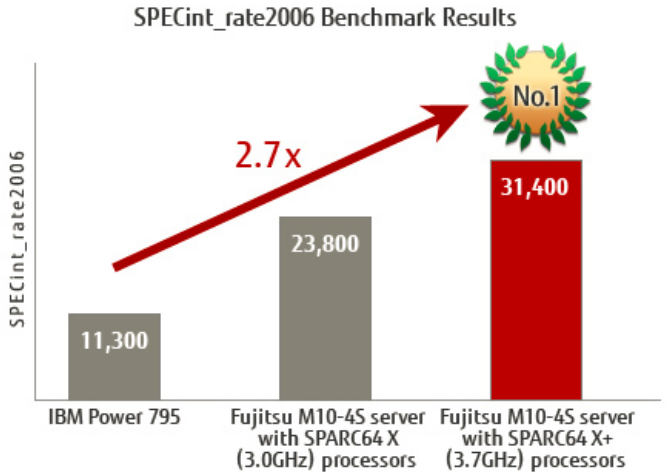
- Buy the right hardware
- Hire the right internal leadership team
- Hire the right internal technologists
- Hire outside Subject Matter Experts as required
- Go outside to managed services for those requirements where you can not justify going it alone internally
  - DNS Administration
  - Firewall Configuration
  - Migration and Upgrade
  - Network Administration
  - Storage Administration
- If you go to "the Cloud" to host your applications go with a reputable provider like Oracle and ask a lot of questions: Especially the difficult ones

Remember we started talking about mainframes?



Not an Exadata

Fujitsu
Oracle



These benchmark results indicate the latest Fujitsu M10 server's high speed performance. Designed to easily integrate with previous Fujitsu M10 servers, it protects current infrastructure investments, and provides flexibility and scalability to match business growth. In fast moving, ever-changing

We started talking about mainframes

IBM

System z10 EC is great technology that is designed to help you lower your running costs

Great Technology

- Low point of entry and expanded granularity: 100
- More flexibility with more engines: 64 engines
- More powerful specialty engines for new and different workloads: 50% or more
- Upgradeable from previous generation IBM System z9™ and IBM zSeries® 990 (z990) servers
- Accredited with EAL5 security classification
- Highest Capacity / Kilowatt rating

Great Value

- Pay for the capacity you need, today and for future growth
- Designed for 'right sized' configurations
- Improved price / performance for Linux®, Java™ and eligible data serving workloads
- Improved investment protection for z9® and z990 customers
- The highest security rating for any publicly available server
- Lowering the cost of electrical power and cooling

The Pricing Advantages of the Latest Technology

- Generation to generation price / performance improvements for software and maintenance from z9 and z990
- Consolidate x86 software licenses at up to a 30 to 1 ratio
- Sub-capacity software pricing to better align IBM software costs with use: Lowest cost per unit of work
- Expanded Virtualization capabilities that enable Total IT Cost savings Gold Standard

Introducing the World's first Enterprise Quad Core with the performance to replace more than 120 x86 cores.

We started talking about mainframes

z/VM Virtualization Value point #2: Environmental Cost

z/VM or x86 Virtualization?
IT Cost Implications of Scenario #1

z10 EC – 26 IFLs

30 Square Feet

Hourly Energy Usage: 16.3 KWatts

Annual Energy Usage: 0.2 M KWatts*

Cost: $24.6 K/year

z/VM Net Savings per year
900,000 KWatts

$108.4K

81% Less electricity

8 Racks of x86 Blades (304 CPUs)

43 Square Feet

Hourly Energy Usage: 87.8 KWatts*

Annual Energy Usage: 1.1M KWatts*

Cost: $133.0 K/year

* Source of power consumption data for the Sun SunFire X2100 (1U) Opteron 2.8 GHz 1 MB server: *Competitive Profiles*

Become Greener with z/VM Virtualization on z10 EC: 5X better than x86 Virtualization

We started talking about mainframes

- Is there anyone, anywhere, that doesn't know what an Exadata is and what it could do for them if they had one?

Exadata X4 Compared with X3

Much More Performance and Capacity Same Price

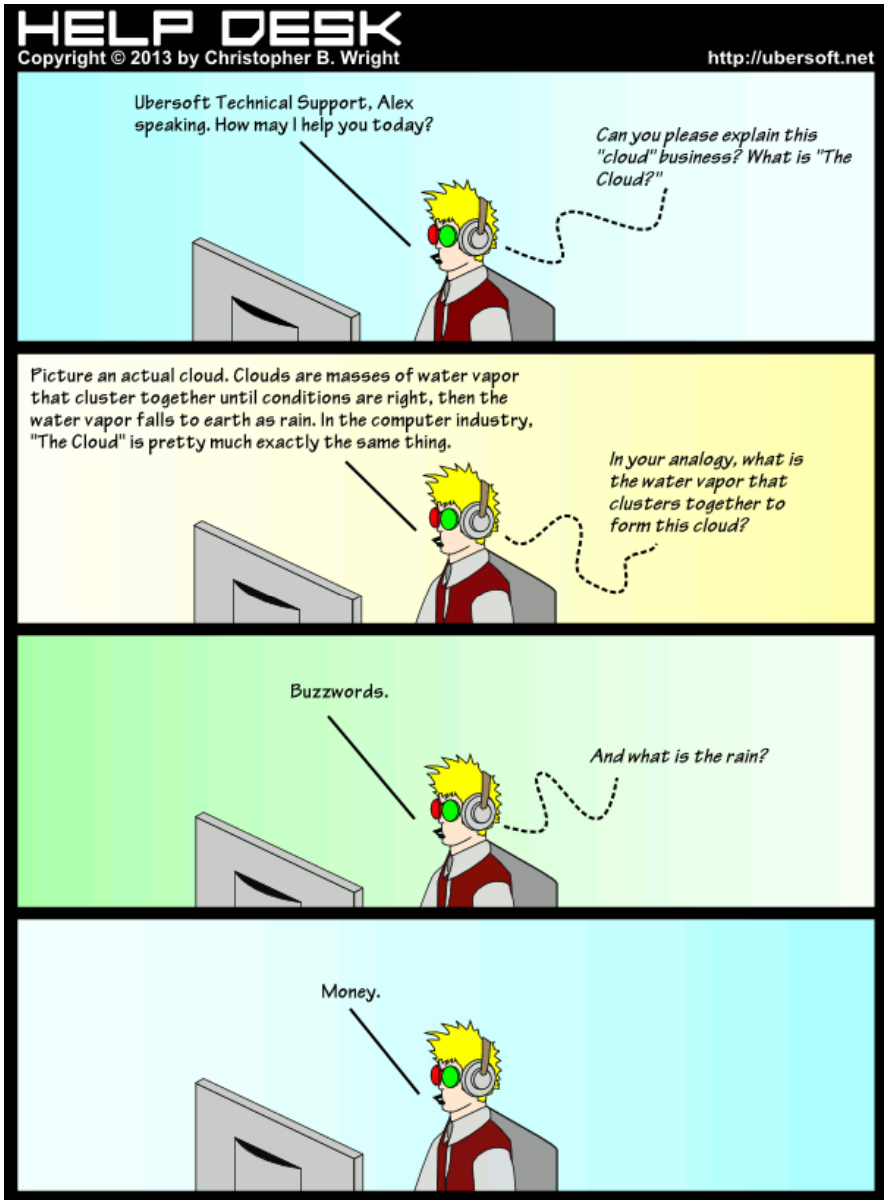
X4 Storage

2X Larger Physical Flash Memory	44 TB of Flash Memory
Up to 4X Larger Logical Flash Memory	88 TB using Flash Cache Compression
77% More Flash IOs/sec on X4-2	2.66M Reads, 1.96M Writes from SQL
33% Larger High Capacity Disks	672 TB using 4TB Disks
2X Larger High Performance Disks	200 TB using 1.2 TB Disks

Per DB Machine Full Rack

X4-2 Compute

50% More Database Cores	192 Cores using 12-Core Xeon® CPUs
2X Larger DB Server Local Storage	2.4 TB per server using 600GB Disks
2X Faster InfiniBand	InfiniBand PCI-3 Card. All Ports Active


HELP DESK
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http://ubersoft.net
Ubersoft Technical Support, Alex speaking. How may I help you today?
Can you please explain this "cloud" business? What is "The Cloud?"
Picture an actual cloud. Clouds are masses of water vapor that cluster together until conditions are right, then the water vapor falls to earth as rain. In the computer industry, "The Cloud" is pretty much exactly the same thing.
In your analogy, what is the water vapor that clusters together to form this cloud?
Buzzwords.
And what is the rain?
Money.

Thank you

never forget ... your Cloud Provider is trying to cut costs too

... who you choose is important