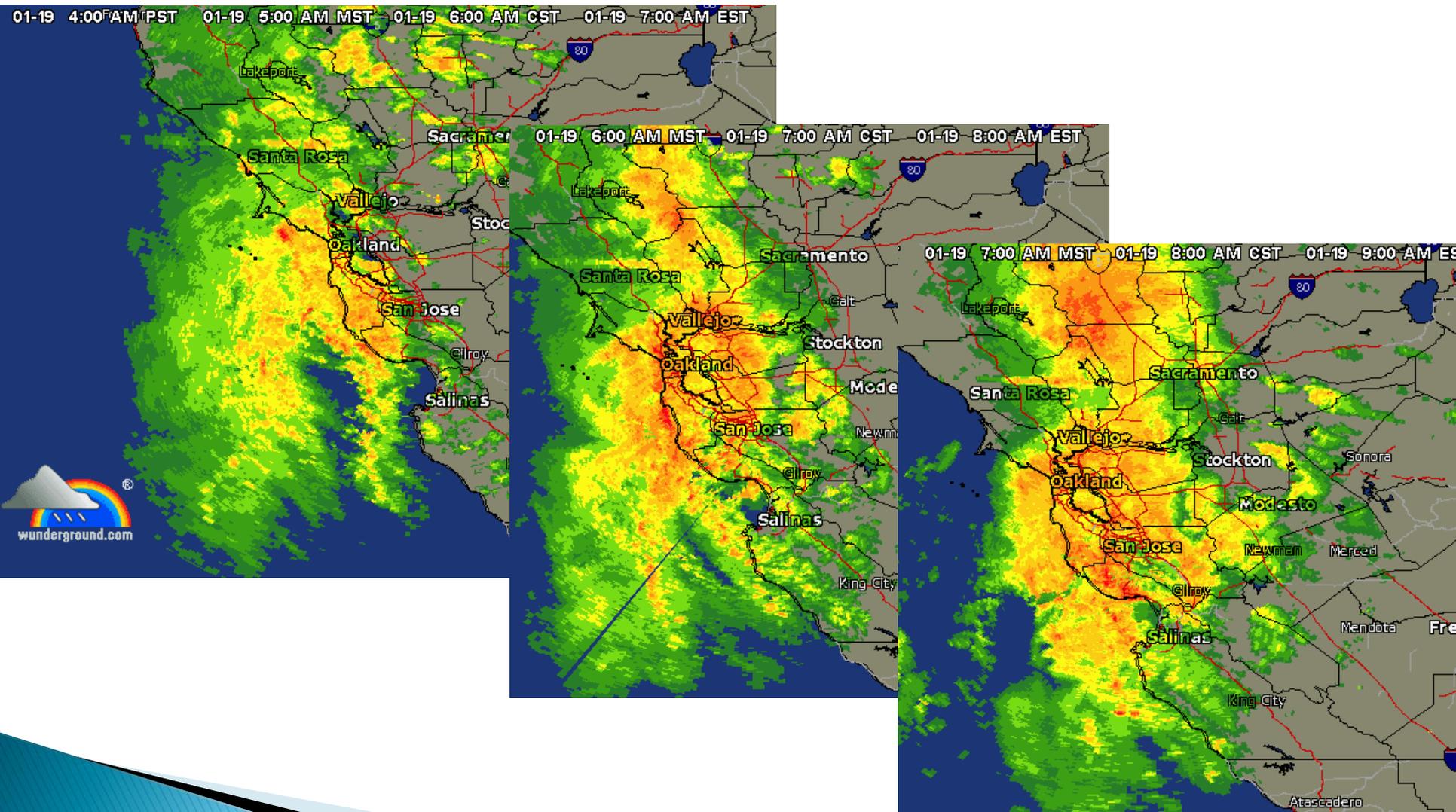


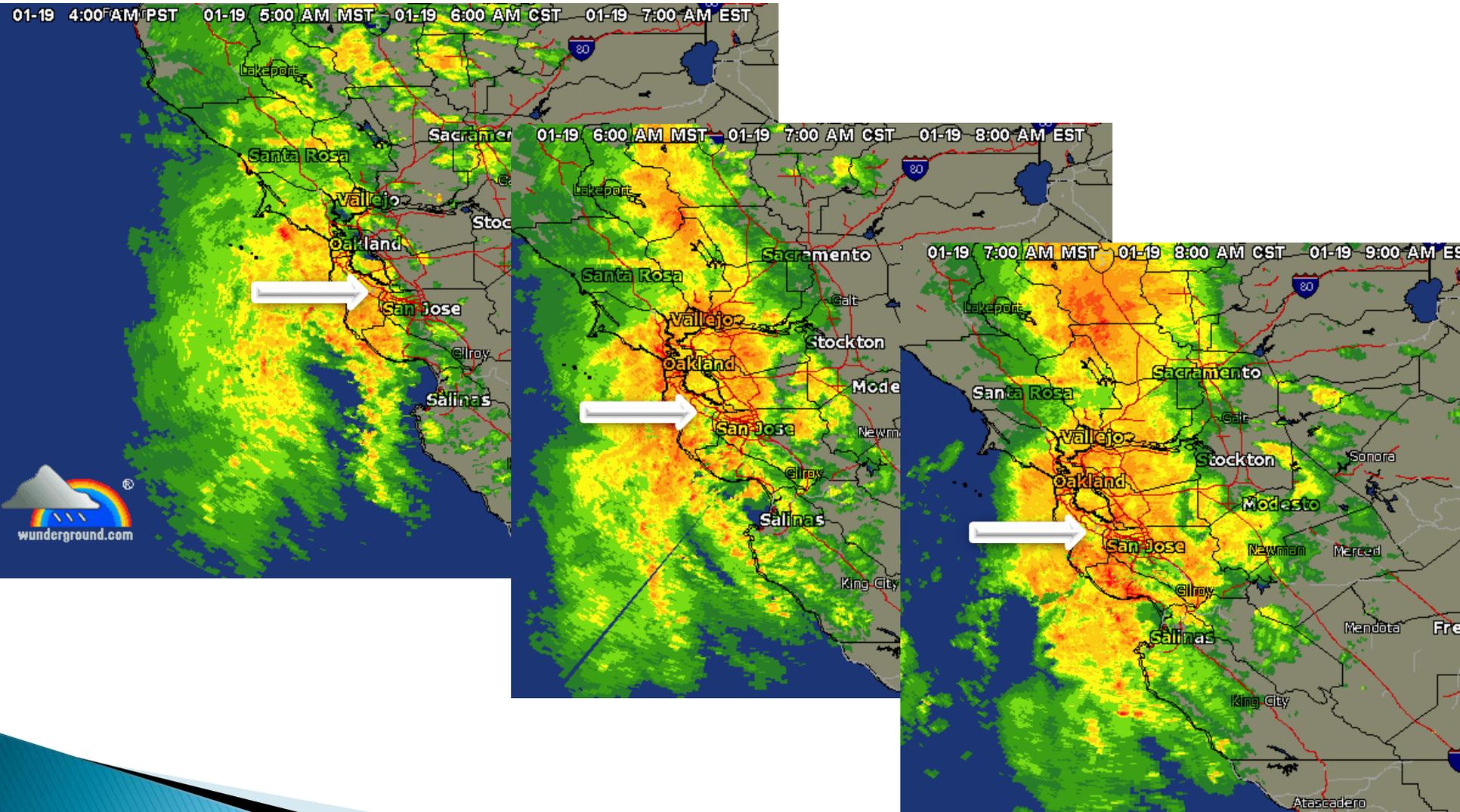
Lessons Learned From a Site-Wide Power Outage

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19 January 2010



19 January 2010



Timeline overview

- ▶ Mon, Jan 18 – Federal Holiday (SLAC closed)
- ▶ Tue, Jan 19
 - 05:15 – powerful thunderstorms knock out power to SLAC, Stanford Univ. and surrounding area
 - 10:30 – Stanford campus has power
 - 19:30 – power available to SLAC site
- ▶ Wed, Jan 20
 - 07:30 – powering up facilities begins
 - 10:50 – Computer building gets power
 - 18:00 – essential computing services restored
- ▶ Thu, Jan 21 – SLAC (largely) back to work

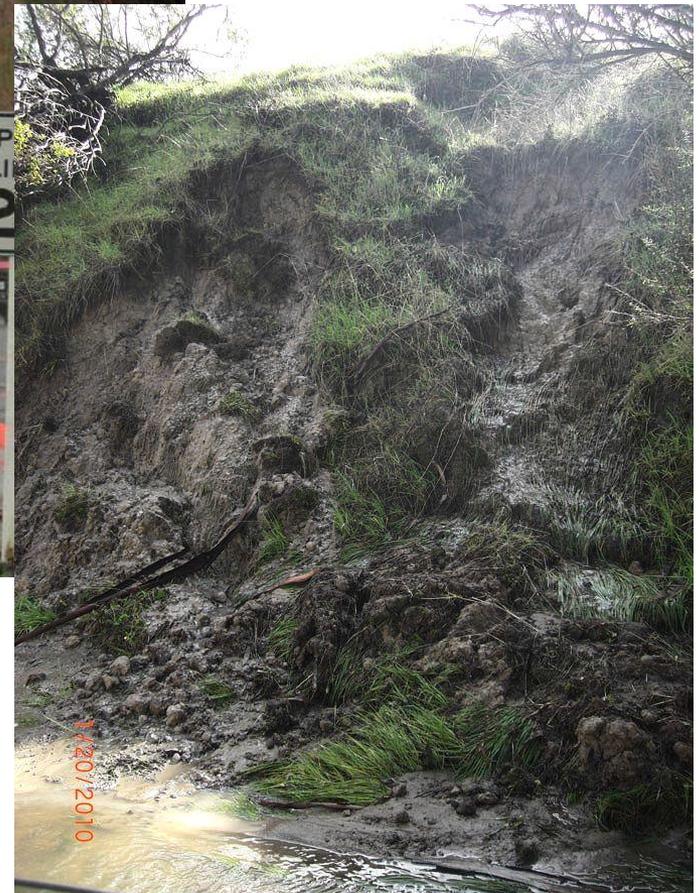
SLAC, 20 Jan 2010



SLAC, 20 Jan 2010



Facilities Dept busy with
flooding, etc.



Every outage is different

- ▶ Computer bldg or partial site outage
- ▶ Full site outage (e.g., 2005 tree fall)
- ▶ Area-wide outage (like this one)
- ▶ Regional or larger outage: major earthquake

For planning, need to think about these various scenarios.

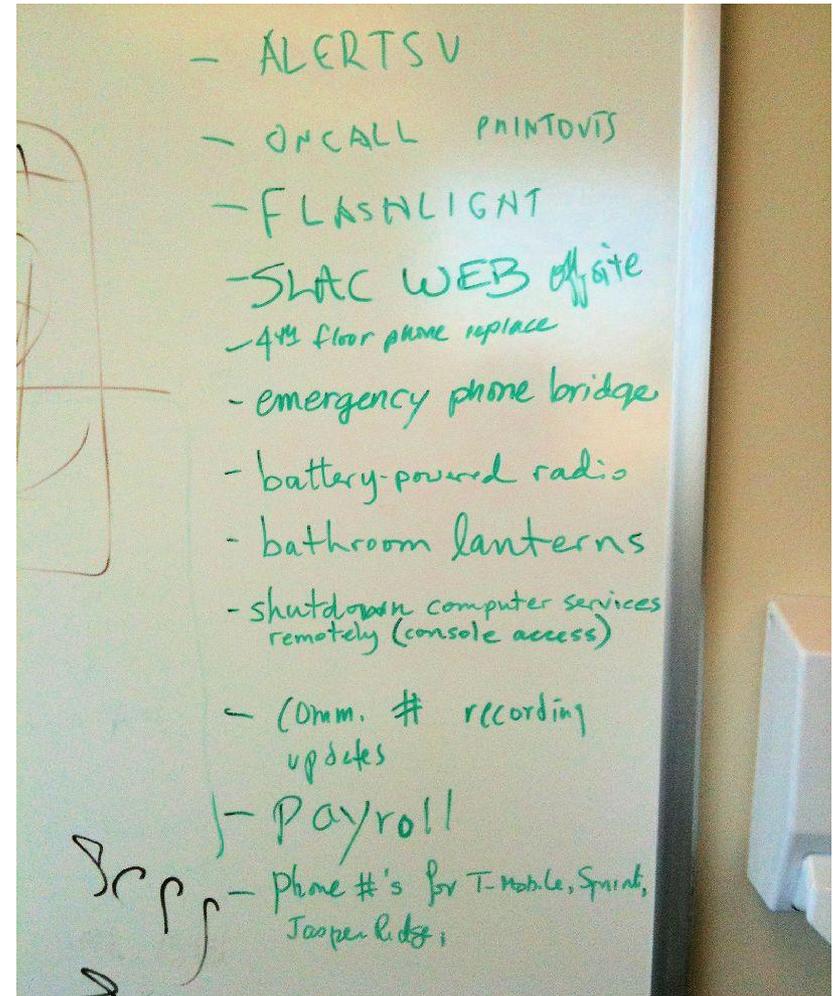
Computing Goes Down (01 / 19)

- ▶ 05:15 – arterial 230 kV line down
 - Feeds both SLAC's main 230 kV line and, via Stanford, our 65 kV backup line
- ▶ Computing Operations Manager (already onsite) calls other managers, begins shutting servers down (limited UPS)
- ▶ 06:30 – SLAC Director closes lab, except for essential personnel
- ▶ UPS runs out, SLAC network (& everything else) down

Managing the outage

Jan 19 (no power)

- ▶ Computing managers gather in lounge with daylight & whiteboard
- ▶ Priorities
- ▶ Plans
- ▶ Things to change – plan for the next outage



“Physical” Issues

- ▶ No lights:
 - Meeting rooms & restrooms
 - Stairwells (after emergency batteries run down)
 - * Get lanterns for restrooms, etc.
- ▶ No coffee
 - * ES&H manager made Starbucks runs

Once power was on:

- ▶ Noise in machine room – hard to use phones
 - * Noise–cancelling telephones

Computing Recovery (01 / 20)

- ▶ Utility company restored power to site late 1 / 19 – SLAC facilities crews need break
- ▶ Early 1 / 20 facilities work to restore power and cooling
- ▶ 10:50 – Power to Computer building
- ▶ 11:10 – Cooling water circulates – but chillers don't start until ~11:30 (OK – heat capacity)
- ▶ Begin coordinated power up
 - Should have designated coordinator.

Updates in meeting room

NET
 10:50 Lights ON
 11:09 CORE APPEARS TO BE UP
 GARY & CARL GO OUT & BRING UP OFFSITE LINKS
 BREAKER PWR TO EPN NEEDED. JOHN & CO
 READY TO ENERGIZE
 12:09 Load balancers, EPN internal FW, all EPN switch (servers) up
 An outside door open, out from roof
 Unix Das up. BCOO has net connn, waiting on (w/ all, 2nd, Tim)
 Working on esub. SWH-B50FB came up
 FWOZ health no connection, having issues
 12:25 Fwoz misidentified (needs new cable), it is now up
 78°F ESUB up. VPN internal up. Console server up
 VPN external coming up. Wireless up in B05B
 Windows (RTR-FWOZ) server to come up
 Network in B05B, 05 & 06 OFFSITE UP @ 12:20 (90min) 1:00
 Hand drier & cool water
 Visitor web access login in up
 Don is DOWN, can see switch OK 2:30
 1:26 Don OK, it was a laptop & was a DHCP problem. 2:40
 Working on Psoft in C8B3B 2:50
 2:00 B041 low power. SWH-KEE is OK, but files in C8B3B
 have hub & are running OK. There was a VPN prob on
 visitor net. Psoft files gone to B041. Called Ernest to
 look @ conference. 4:10
 2:15 More cooling. 2:31 B041 FI OK 5:10
 3:07 B054 has power. Switch is down, double
 feed, prob w/ cable config. B050FI conf net OK

APPLICATIONS
 12:45 EXCH2005 up
 12:45 EXCH2007 on the way up - IN PROGRESS approx @ 2:50
 1:00PM CITRIX UP
 ACTIVE DIRECTORY UP
 VPN UP
 GLAST UP
 12:50 NOSPAMS 1,2 mail coming into SLAC
 12:50 left msg for NORCAL -
 1:15 MONICA 1.10 IN CONF. ROOM B
 1:40 OPERATIONS MANAGER UP
 2:40 FILE SERVICES UP
 SLACSPACE UP
 2:50 - rest of MAIL servers coming up - done @ 4pm
 3:35 phone directory (no phone)
 4:00 - Exchange 2007-reboot complete and all up
 4:17 - crawl db, thumbnail photos, Pdbgl ok

Priorities

- ▶ Payroll – need to deliver data to bank by 20:00 January 20th
 - No longer able to fall back to last months!
 - Administration bldg: computers & printers needed
- ▶ Fermi Gamma-ray Space Telescope –
 - Monitoring instrument health
 - Process data within 72 hours
- ▶ Email
- ▶ Web
- ▶ What else? Guard house? Guest house?

Internal Documentation

Need physical print-outs (had some, need more)

- ▶ On call list
 - home/cell phone numbers
 - **alternate email addresses**
- ▶ Other phone numbers:
 - Cell providers
 - Others dependent on us (Jasper Ridge)
- ▶ Server up/down dependency list
 - Currently: Excel spreadsheet
 - Needs regular update/review
 - Ideally, derive from Rackwise DB
- ▶ Wiki Pages
 - ... and where are your browser bookmarks?

Communications

- ▶ SLAC piggybacks on Stanford's 'AlertSU'
 - Very useful – phone/text/email alerts
 - But: Stanford's emergency webpage said nothing about SLAC, though it had campus information
- ▶ SLAC web – know from previous outages we need an offsite webserver
 - CDN would be ultimate solution (no time soon)
 - Responsibility split among various SLAC depts
 - SLAC “emergency” server on Stanford campus, or at DOE, is first step
 - Need to be able to update DNS too!

Communications (2)

- + Phone meeting with Fermi GST (14:00, 1/20)
- Slow receiving updated info to put on website
- Computing phone status line is no longer updated
- lab status line also needed more frequent updates (it is off-site)

Other Issues

- ▶ Unknown dependencies; example
 - Payroll depends on particular computers and printers in the Administration building
 - Oracle for business depends on AFS
- ▶ Mis-labeled equipment
- ▶ Better coordination with Facilities Dept:
 - They can respond to what we need.
 - We can supply services critical to them.
- ▶ Gateway machine for OCIO staff – e.g., existing machines too restrictive for DBAs

Other Issues (2)

- ▶ Networking (& wireless) for computing staff offices should be a priority
- ▶ Need accessible Service Processors for private business network
- ▶ Problems with console machines
- ▶ Better cell phone coverage
- ▶ Better monitoring of UPS

Summary: Planning (1)

- ▶ Need to plan
 - Priorities
 - Communication
 - Documentation
 - Dependencies
 - Eliminate the ones you can
 - Document the unavoidable
 - Alternate communications; e.g., Fermi GST has established Google Pages for internal & external information

Summary: Planning (2)

- ▶ Once you have a plan, inform the wider community, so they know what to expect
- ▶ Ideally, develop a map that shows
 - applications/services =>
 - machines required =>
 - power & cooling requirementsSo when need arises you can respond

Summary: Computer Center

- ▶ Keep documents up to date!
 - and make them accessible multiple ways
- ▶ That includes labels on machines, cables, etc.
- ▶ Maintain robust critical control systems
 - what might be a minor annoyance under normal circumstances can become a real obstacle during a crisis
- ▶ Monitoring – ditto

Any outage is a good time to start planning for your next outage.

