

zEC12 User Experience: Flying High on a Concrete Slab

J. O. Skip Robinson
Southern California Edison

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Our Reasons for Buying zEC12

- Performance of zEC12 has been widely touted
- Less noted is ability to sit on concrete with no raised floor
 - The first full-sized mainframe ever with this capability
- We were waiting for some time for such a box because...
- We were building a new data center with no raised floor
 - The hot new thing in data center design
- Over time we got informal 'progress reports' from IBM
- zEC12 announcement was a red-letter day for us
- **Slab-floor feature was the primary selling point for us**
- I believe that this interest will deepen over time

SCE Data Center History

- We had supported two data centers for decades
 - Old-old (O-O) opened 1974
 - Old-new (O-N) opened 1987
- Both have traditional raised floor with water for cooling
- Full refrigeration air conditioning
 - Built for multiple bipolar boxes long gone
- Both data centers eventually outlived their shelf-life
- Infrastructure was getting increasingly sketchy in O-O
- Problems were also developing in O-N
- Time came to move forward

SCE Data Center History

- Meanwhile mainframes upgraded over time to CMOS
- In 2008 we moved mainframe production from O-O to O-N
- Designed around one large z10 and one small z9
 - Data host and ‘penalty box’ respectively
 - Sacred Basket Paradigm: one CEC holds all precious eggs
 - Penalty box hosts costly utility software but holds little data
 - Also houses duplexed and alternate CF structures
 - Both CECs were later upgraded to large + small z196
- O-O became internal DR site: small z10 with CBU
- DASD mirrored from production O-N to DR O-O via XRC over DWDM (Cisco)

Fuzzy View of New-New Data Center

- Built new from the ground up
- Designed to be 'greenish'
 - Not 'certified green' but follows that model
- No refrigeration, only evaporative coolers + dehumidifiers
- Alternating hot/cold aisles in contained 'cells'
- **No raised floor**
- **All cabling (power and I/O) and air flow runs overhead**
 - <begin rumor> Raised floor required for cabling, not air flow
 - On z196 chilled air pulled in through above-floor panels
 - But RF shielding depended on thick steel floor tiles
 - Shielding was IBM's major challenge <end rumor>

Challenge – Start a new life in an unproven environment w/o raised floor

- 2 new zEC12s with overhead cabling
- New DS8000 with overhead cabling
- New tape subsystems (STK) with 'mixed' cabling
- New FICON switches (Brocade)
- New DWDM ISL (Inter Switch Link) to O-N data center
- Overhead power distribution with 'Bus/Tap' for each device
 - A computerized gizmo required in N-N, custom built
 - Overhead cabling framework with multiple patch panels
- New seismic tethering technology for slab floor
 - Each device had to be engineered individually

Challenge – Migrate production to N-N with ≤ 12 hour outage: the Big Bang

- First we moved DR function from O-O to N-N temporarily
 - No breathless rush, no risk to production, daylight hours
- Enabled validating environment including new DWDM
- On Big Bang night, we shut down production in O-N 20:00
- Initiated DR recovery in N-N via GDPS automation
- With all systems in DR mode, we transformed environment
- Edited parm libs and PROCs to run in production mode
- Then re-IPLed all as production and tested like h*ll
- At 07:00 on Sunday, we declared N-N to be production
- Never again IPLed production systems in O-N

Challenge – Complete project by date agreed to return old boxes to IBM

- I've never been involved in populating a new data center
- For z196 upgrade in O-N, we did a push-pull in two stages
 - Boxes arrived end of December
 - First z196 installed 3rd week of January
 - Second z196 installed 2nd week of February
- For zEC12 in N-N, we figured it would take a bit longer
 - Boxes arrived end of December, so we projected mid May
- In a new environment, you cannot assume anything
- Device problems could be chipid, cable, switch, device
- Or could be connection error or IODF error or both

Challenge – Getting it done

- Debugging and correcting went on for months
- **Never once did we find a problem with zEC12 itself**
- Most problems turned out to be cable or connection errors
- Some players had other duties in N-N for other platforms
 - N-N was being populated by X86, P-Series, and others
 - Mainframe did not have everyone's undivided attention
- Big Bang finally occurred in mid July
- We met the IBM contractual date
- Both 'extra' boxes have been returned to IBM
- We are once again a 3-CEC shop

Yes, Virginia, It Really Does Fly

- Each zEC12 was sized for MSU comparable to z196
 - Exact match not possible, but we got close
 - Reason: minimize software license hits
- Small CEC remained at model 401, smallest possible
 - 1 slow CP plus ICFs + zIIP plus CBU for local failover
- Large CEC was **reduced** by 1 CP vis-a-vis z196
 - Also has ICFs + zIIP + IFLs
 - ICF/IFL/zIIP are faster than z196 with no license hit
- z/OS 1.13 with FIXCAT IBM.Device.Server.zEC12-2827.*
- 2 boxes support 3 parallel sysplexes + 1 monoplex

Everyone is Smiling

- Performance has been excellent
 - Truth-in-lending: all h/w is faster in N-N
 - All devices and links upgraded to 8 GB
- Reports so far (since 7/14) are somewhat anecdotal
 - Little time so far for full analysis
- We see shorter run times with less CPU consumption
 - Batch jobs
 - CICS transactions
 - DB2 (V9) queries

Some Performance Examples

- A meter read generation job
 - Last run on z196: 6 min 13 sec CPU for 230,110 accts
 - First run on zEC12: 4 min 21 sec CPU for 230,179 accts
- A long running DB2/SQL job
 - Last run on z196: 42 min 18 sec CPU
 - First run on zEC12: 26 min 29 sec CPU
- A user sample of many DBA batch jobs
 - 10% CPU reduction overall

CICS CPU Usage by Transaction

- CICS report each month shows CPU usage
 - Listed by transaction, summarized in Total line
 - Data goes back a couple of years

- Here are some recent numbers

- July report is latest available

- Note that Big Bang occurred mid month (7/14)

Month	May-13	Jun-13	Jul-13
Total	1,112,163	1,125,701	857,818

- No reduction in transaction count

- **Is this possible?**

Questions?

