SCTE DVEP
Section 5: Digital Video Systems Deployment
Agenda

• Applying a design to a field site
• Pre-deployment planning and preparation
• Managing a deployment transition
• Closing out a deployment program
Applying a design to a field site

Despite the trend in the industry to more uniform approaches, sites still vary significantly and these changes need to be taken into account in applying an architecture to a particular site:

- Even if the same vendors equipment is used, equipment scale will vary
- Subscriber counts will vary
- Network capacity will vary
- The balance between regions, super headends, headends and hubs will vary
- The balance between pure fiber and coax will vary
- Upstream bandwidth will vary

A site survey is the right place to begin deployment planning for a given site.
Note: Trial requirements might be lower than deployment requirements!
Site Survey – Physical space

- **Rack space**
  - How many RU are required?
  - Are there alternative form factors?
  - Does equipment need decommissioning to make room?
  - Spacing requirements of equipment (gaps between devices)
  - Depth of equipment vs. racks
    - Is there room to complete wiring without exceeding radius of curvature
    - Is there acceptable access behind the rack
  - Heat evacuation per rack
    - Additional fans?
    - Panels / doors?
  - Can you physically maneuver the equipment?
  - Is there room to stage the equipment before installation?
Site Survey – Power considerations

- 110V ac / 220V – single / dual phase
- Field moving to 48Vdc
- Are there sufficient outlets?
- Do you have sufficient power cables (other connections)
- Current draw under load vs. at idle
  - Is there enough capacity for initial demand?
  - Will you add additional cards in the near future?
Site Survey – IP Network Considerations

- **Identifying the right address space**
  - Will a re-IPing be required?

- **Review existing network capacity vs. need**
- **What QoS is assumed or required? Within the headend / MTS and out to the subscribers**
  - What is the current contention rate and how does that map to assumptions?
  - Is any spare capacity already scheduled for another project or program?
  - Is unused capacity designated as required headroom?
  - Unicast vs. multicast, different flavors of IGMP

- **Are there sufficient physical ports?**
  - Do you need a new blade?
  - New chassis?
  - Additional PS?

- **Firewall ports / capacity**
  - Has all traffic been identified?
Site Survey – IP Network Considerations

- How will monitoring be supported?
- Do you have SFPs? Fibers etc. of correct length?
  - Copper vs. optical interfaces?
  - Allow for neat wiring!

- 2400 pair copper cable:
  - 1 call per copper pair
- Capacity of a single fiber:
  - > 500,000 calls
Site Survey – Outside plant considerations

- Is there any relationship between node size and the new service?
- Is there any relationship between service group size and the new service?
- Will nodes or service groups need splitting?
- Is there sufficient fiber in the ground or overhead?
- Is CDWM sufficient or is there a need to go to DWDM (single mode vs multimode)?
Site Survey – Outside plant considerations

- What are actual vs. required signal levels, SNR etc?
- Is there sufficient RF spectrum?
  - Freq range and performance of amps? Of passives?
  - For a trial? For launched service?
  - Upstream and downstream?

NTSC = National Television Systems Committee
Site Survey – Transition cases

Are there special considerations during the deployment and testing phase that need to be managed before service is cutover?
Is it a completely new service? An upgrade to an existing product? A replacement?
  – Is there a need to “dual illuminate / simulcast”?
  – Must two clients be broadcast for a period of time?
    • What is the performance impact on the existing service?
    • How well will the new service perform under the constraints?
    • How will the transition from the temporary to the final state be handled?
Site Survey – Transition cases

- Do we need double the network capacity?
- What is the impact on redundancy or headroom of running simultaneous conditions?
- Do trouble-shooting procedures change? Do people know?
- Are there config changes that need to be made? When – to maintain support of the old or to suit the new?
- Consequences?
Site Survey – Soft Items

• Local contact staff
  – Are they aware of the program?
  – Do they have required basic knowledge?
  – Do they have time to support the deployment?
• What other projects are underway that you need to dovetail with?
  – How important are they?
  – Who is schedule arbiter?
• How will POs be placed and goods received?
  – Central admin vs local admin – division of responsibilities
  – Where will equipment be stored before installation? (How big?)
Settop compatibility

Video services / experience can be tied to settop model
- Does a given site have particular rare vintage model?
  - Will they be recovered from field, not supported, special provisioning required?
- Is there sufficient memory?
- Is an application version dependent on a middleware, OS or other stack version?
- Which models require a reboot? What is the failure rate?
- Which software rev matches with model?
- Any issues with multiple STB models within a home?
- Can the app be provisioned by STB type? By hub? By account?
- Are there any concerns around use of certain ports on a model?
- Widescreen vs full screen experience?
- Are all remote keys compatible with old STB models?
Documentation

- Rack elevations and Wiring Diagrams
  - Confirms space is available
  - Supports pre-wiring of racks
  - Helps with receipt of equipment (do we have all the bits?)
  - Accelerates installation (maximizes on site time)
  - Helps identify anomalies (e.g. needing phone line for VPN)
- Network drawing
  - Ensures address space(s) correctly allocated
  - Ensures sufficient ports
  - Allows firewall configs
  - Helps identify need for additional hardware
- Methods and Procedures
  - Set expectations for all personnel
  - Help field staff to identify exceptions (esp. across silos)
• Document required config settings
  – In vendor documentation
  – In MSO architecture and design documentation
  – In tech bulletins or release notes
  – In acceptance testing or other qualification test reports
  – In deployment manifest

• Record any exceptions from standard
  – Make sure support team is aware
  – Use your MSO’s documentation method (asset tracking, NOC, trouble-ticketing etc.)
  – Note in service date for warranty purposes

• Don’t forget to include approved failover / work around scenarios
Site Specific Bill of Materials

- Inventory of existing equipment vs. the required new state?
  - What can be re-used?
  - Can anything be traded in?
  - Which model is most appropriate now and with a future view?
- AC vs. DC power
- Are auxiliary components provided by the primary supplier or do they need to be ordered separately?
  - E.g. Cabling
- What about spares? New – reuse of existing?
- How are support costs affected?
- Are any new tools required for the installation?
- Shipping address might not be the service address
Building the deployment team

Deployments often include local personnel, vendor personnel and corporate team members

- Site engineering and business management need to understand the business value
  - Reducing costs; increasing reliability; standardization; competitive advantage; improved flexibility; new features
- Local team needs involvement in schedule development to identify local conflicts
  - Other projects; pre-booked maintenance windows; blackouts
  - Cut over wholesale or piecemeal? What do the pieces look like? What does remediation look like?
- Clear division of responsibility
- Clear change management process involving all relevant stakeholders
  - Clear method of communicating the changes down the line
Pre-Deployment Planning and Preparation

- **Document As-Is and To-Be states**
  - Helps to identify the steps needed to be taken in the transition and to determine optimal order
- **Develop and sign off on deployment schedule**
  - Identify gates
  - Identify staffing for transition activities (local, vendor)
  - Site readiness, operational and network readiness
  - Schedule maintenance windows in advance (by MSO)
- **Validate method and procedure for transition**
  - Check steps are complete and consistent with software revisions
  - Ideally have an uninvolved person do the verification to make sure assumed steps aren’t missed
Verify key areas

If customer facing

- Customer care updates
  - Document new expected behavior, service codes trouble conditions and responses
  - Can they see the application from the call center? (Remote access)
  - When is the maintenance window?
  - Is call volume expected to rise? Are we staffed?
  - Are mandatory notifications required (franchise rules, FCC)?
  - What expectations set in marketing literature
  - Can all models be provisioned? What is replacement policy?
  - Will there be a forced reboot?
  - Will any customer data be lost in transition (e.g. DVR schedules)?
Verify key areas

If customer facing – cont.

- Have field techs received adequate training?
- Has billing and provisioning set up been completed? Tested?
  - Is this a tiered service? Bundling discounts?
- What error conditions can be expected during a transition? How long will they persist? (Til reboot? 24 hour download?)
Verify key areas

Is there a back out procedure?

− Has it been tested under the same transition conditions?
  • If not, what differences exist? Any likely impact?
  • What order must tasks be executed in?
  • Is backout the reverse of execute or something different?
− What must be done for backouts to work correctly?
  • Usually creating a backup
  • Sometimes re-iping back to an old schema
  • Has a checklist been generated and completed?
− What conditions trigger a back out?
  • Who makes the decision?
  • What information should be recorded?
Getting Ready for Launch

Each program requires its own checklist. These are typical elements:

- Verify correct software is available
  - Compatibility matrix of revision vs. STB model if applicable
- Verify vendor support is available
- Verify connectivity (inc. VPN if appropriate)
- Verify stakeholders are all ready (Go / No Go)
- Verify staffing availability (MSO, vendor)
- Verify tools availability
- Verify test plan exists to confirm success
- Understand operational impact
  - Will other services be impacted during maintenance window?
- What is expected performance after the change?
- Does operations know how to support this after the fact?
Trials

Different projects and services may suit different types of trials

Headend Trial:
- Usually no impact to subscribers, often prelude to technical trial
- Does the product perform in the headend the same as in the lab? (Was something missed? Interaction?)
- Stability over time (headends usually more stable than labs)
Marketing Trial
- Typically one or two sites in different markets, limited duration
- If, when, where do we want to launch this product?
- How well do subscribers like the product?
- How frequently do they use it? What for?
- What works well? What do people struggle with?
  - E.g. Analyze the path through the app to identify stranded sessions
- Testing different pricing models?

Customer Expectations
- Value price propositions
- Intuitive
- Reliable
- Safe and secure
- Choice and control
- Seamless
- Device agnostic
- Available
- Easy to do business with
Trials Continued

Technical Trial

- Does the product work in the field the way it did in the lab or headend?
- Sometimes used for vendor selection
- How well does it scale? By Service Group? By User count?
- What do failure modes look like?
- How reliable is it really (vs. in theory)?
- What operational challenges does it present?
- Can we monitor it?
- Does it match our performance expectations (e.g. throughput, responsiveness)
- Are any improvements required before launch?
- Bug list / punchlist
- Does the documentation need updating?
  - Is it accurate and sufficient? M&Ps
Employee Trials

- Does this perform in the network the same way it did in the headend?
- May be used as part of vendor evaluation
- Are there any critical scaling problems? (e.g. simultaneous session limitations)
- Are there critical bugs we missed in QA (more users implies more likelihood of finding problems)
- Are any improvements suggested that could easily be accommodated before launch?
- How well can we support this? What call volume might we drive?
- Minimizes impact on the network compared to a full technical trial
- Keeps new product plans private (the competition will not know)
- Usually a prelude to a full launch
Trials Continued

- Might elect to test in a single node, service group or hub to limit impact to plant or the amount of equipment to be upgraded.
- Launching one hub at a time can keep call volume and truck rolls to a manageable level (to maintain responsiveness).
- Launches can sometimes be planned to allow one facility with the new code to be backed up by a facility on the old code if sufficient network capability is in place.

![Diagram of Headend to Node connections with Fiber Optic and Copper Coaxial amplifiers, up to 250 homes per node, labeled as Test Node.]

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Bug Reviews

Do we understand the nature of the bug?

- Does it affect all settops or only a subset?
- Does it affect all content (linear, on demand, HD, SD) or only a subset?
- How frequently does the problem occur? (Weekly, daily, hourly)
- Is there a workaround (reboot?) and what is the impact? Is it easily communicated to the subscriber?
- How frequently is the impacted feature used?
- How many changes would be required to fix the problem permanently? Hardware, firmware, drivers, application software etc? When will the fix be available?
- How invasive will it be to apply a fix if we launch with the problem, compared to fixing before we launch (implying launch delay)

All these lead to an evaluation of a critical, major or minor evaluation and drive a go/ no-go decision
Importance of Methods and Procedures

New service roll outs and upgrades require procedures

- Ensure that all the steps are taken into account
- Ensure that actions are taken in the correct order (dependencies)
  - Checking off the steps drives conscious action
  - Identify any outage – driving or requiring steps
- They help with the planning for how long an upgrade may require – one maintenance window? Two? Which steps in which window?
  - Timeline estimates allow you to determine if you cancel an upgrade partway through because you can’t be completed within the window
Importance of Methods and Procedures

New service roll outs and upgrades require procedures – cont.

• Help with understanding the impact of different steps
  – Should include expected results to identify if the changes have taken
  – Allows for identification of unexpected behavior (e.g. device didn’t come back up)

• Ensure that if something goes wrong, the cause can be traced, because the actions can be reproduced
  – Easier to compare against logs if action times have been recorded

• Should include a back out procedure to ensure that service can be recovered within the maintenance window

• Should conclude with validations that the upgrades were correctly applied
  – E.g. billing / entitlements can be validated
  – Config files should show correct information
  – Log files should be reviewed to confirm only expected entries are found
Recording and tracking bugs

If you don’t describe a bug properly, you can’t tell if it’s new, fixed or simply finger-trouble

• Does it affect all settops? Does a reboot fix it?
• What steps did the subscriber / operate take that caused the bug to be identified?
• How repeatable is it?
• Important to agree classification (major / minor) to determine priority of resolution

Bug tracking should record
• Time and circumstances of identification
• Reporter and equipment should be recorded
• Manifestation (what happens, when etc.)
• Ticket numbers (e.g. with vendor) should be added to the log
• Proposed and actioned resolutions should be recorded
• Bug should eventually be closed (resolved, waived etc.)
Closing out a Deployment

Closing out a deployment is the final step to success

- **True up the design docs with actuals**
  - Did equipment move in the rack? Was a different port used? Was an IP address changed due to a conflict?
  - Essential to supporting on-going maintenance and trouble-shooting
- **Maintain issue log (bugs etc.) until they are all resolved or closed (waived).**
  - Check status weekly if waiting for RMAs, patches etc.
  - Develop a transition plan for the application of long term fixes in place of temporary workarounds. Are special procedures required until the long term resolution is available? (e.g. weekly reboots)
- **Compare performance metrics against expectations**
  - Are there lingering configuration problems, hardware shortages?
- **Compare customer care impact against expectation**
  - Did call volume meet expectations, or were we under?
  - Was the nature of the calls what was expected, or were different problems found? Could we use ambush messages to improve this next time?
Acceptance and hand-off should be formalized

- Ensures impacted parties are informed
- Should include a lessons learned for future improvement
- Provides a basis for any future upgrades or maintenance work if documentation is in order
- Operational support plans and procedures should be part of this
- Any additional training should be scheduled (employees that were on a different shift, new hires etc.)
- Site should be left with preventative maintenance steps (e.g. daily / weekly backups, checking logs, archiving logs etc.)
  - Daily logs should be maintained of checks executed, changes made
- Trouble-shooting documents and escalation produces must be included for Ops to take ownership (instead of vendor / installers)
- Tracking of installation and turn up can affect warranty;
  - in service date should be agreed with the vendor to avoid warranty or support problems