Section VII

SYSTEM DEPLOYMENT

7.1 PURPOSE

This section discusses the Deployment Phase of the System Life Cycle, see Figure 1-3. Deployment generally overlaps to some extent with Production Use, so these are shown together in Figure 1-3. However, there are distinct activities which take place specifically in anticipation of deployment that do not take place afterward. It is those activities that this section is devoted to.

7.2 SCOPE

The scope of this section is to discuss deployment in general giving attention to the tasks that must be accomplished as part of larger system deployment efforts. The responsibility for these tasks fall to the development Project Manager.

Deployment is a concern from the time system concepts are first explored. It is a critical consideration in development of the System Development Plan and in Acquisition of the system. The needs of deployment must be factored into system requirements and into developing any Requests for Proposals (RFP) used in acquiring the system. This section will discuss these considerations.

Deployment begins after the system has been acquired either through development, procurement, or a combination of these.

7.3 DEPLOYMENT ACTIVITIES

In addition to system definition and acquisition, deployment will require:

- A timeline for deployment be established
- All tasks for deployment be defined and scheduled.
- A Support Plan be developed.
- Necessary facilities, tools, test equipment/diagnostics software, and monitoring devices be defined and acquired.
- Staff required to operate, repair, and manage the system be developed or acquired.
- Service contracts needed be defined and acquired.
- Training needed for staff and end-users be identified and acquired.
- Any data conversion and migration be defined and scheduled.
- New system accuracy, function, performance, and adequacy testing

The tasks listed above are considerable. These tasks need to be done at the earliest possible date after system development begins. Some of the tasks are started as part of the system concept research and are refined and further defined as the system is until all details are known to complete deployment plans.

Many of the tasks above will be worked out with a vendor if the system is primarily acquired via an RFP. These can be made a requirement of the RFP. Examples are:

- Definition of facilities, tools, test equipment and monitoring devices needed.
- Service support contracts.
- Training for technical and end-user personnel
- Data conversion and migration
- Timeline for some activities.

7.4 SUPPORT DEVELOPMENT

Support concepts should begin very early in the system life cycle and continue until they are validated. Figure 7-1, Support Development Over System Life Cycle, shows where the various activities of support development occur. Once support is validated it is monitored for the life of the system to assure it is adequate.

Without support, deployment cannot take place. So, this is the earliest and most important part of deployment planning and execution. The activities associated with support development are shown in Figure 7-1 along the timeline for a system life cycle. However, no one process or plan can be sufficient for all instances of support development. Planning in this area must be flexible and allow for as
many changes as are needed to assure success. Without adequate support, the best design will prove useless – since the system will not be available for use.

### 7.4.1 SYSTEM SUPPORT ANALYSIS

Along with system concepts to meet functional requirements, requirements for operational availability and reliability must be considered. These are requirements which do not always come to the mind of end-users, but must be coaxed from them and established so these important system requirements will be met in design. A great functional system which is down due to any reason, is not meeting needs.

System Dependability is used here to refer to the probability a system will be available when needed and reliable for as long as needed. For some people, availability is once a day and reliability is for eight or nine hours once work is started. For others, like teachers, a system may need to be available three times a day for no more than two hours each time, e.g. morning attendance/grading, afternoon correspondence, and evening work. Of course, it depends on the system and end-user.

The factors affecting system dependability are discussed in Section VIII. Here we want to note that the development of adequate support is probably the most important factor in determining adequate system dependability, a very important system/support performance parameter.

### 7.4.2 SUPPORT DESIGN/DEVELOPMENT

The support process can be designed to meet requirements. Not to do so is to invite risk and potential failure in delivery of an adequate system. This important aspect of system development is too often only given cursory attention. It is not a matter to treat lightly or ignore since without an adequate support mechanism the system will not meet needs.

In-house staff support development and alternatives to them are discussed in Section III. Of course staff are not the only aspects to be considered. Above we mentioned tools, software diagnostics, monitors, test equipment, facilities, etc. But there are other aspects to support development that should be considered. These fall in the area of ‘process’. The existing processes should be reviewed to determine if they can handle the type of efforts and additional volume needed while still being adequate for other systems. Special processes may be needed. Examining these issues after deployment is too late. After deployment is the time to validate that they are working and enhance them if needed – not build them from scratch.

Processes to be reviewed include:

- Help Desk Process
- Work Order Process
- Process for Updating Technical Training
- Equipment Repair & Replacements Process
- Process for Ordering of Parts and Equipment
- Process for Replacement of Tools & Test Devices
- Internal Communications Process

Review of one or more of the above processes may result in:

- Redesign of support processes for efficiency
- Redesign of support processes to handle a new type of work requirement

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**Figure 7-1: Support Development over System Life Cycle**

![Figure 7-1: Support Development over System Life Cycle](image-url)
• Repositioning of spares, replacement equipment/software, test facilities, or test tools so as to speed turn-around on field work orders.
• Establishment of an in-house shop for certain types of equipment
• New procedures to handle new types of problems anticipated, or more efficient ones than currently exist.
• A complete change in the paradigm used for support, a revamping from top to bottom due to a substantial shift in the kind of work anticipated.
• Increased reliance on outside vendors for various support services.
• and etc…

Innovation is sometimes the key to making support work and reducing costs. It is easy to get into a rut with doing things as they have always been, but this is not necessary. Review Section III for some ideas regarding staff. Here are some more ideas:

• Develop a program using high school students or volunteers to supplement internal staff
• Seek grants and offers of free assistance from those offering outside the district
• Leverage the district’s purchasing power to get additional services and support at reduced or no cost from primary vendors
• Establish depots at strategic locations in the district where repairs can be accomplished closer to where they are needed.
• Use standardization where possible to gain economies of scale in purchases and leverage training and staff time.
• Purchase a spare unit for every so many units in-service to allow for a change out so repairs can be done more efficiently off site. (a swap out unit) The number to be purchased will depend on anticipated or actual experience in operational availability and reliability of the units.
• Create mobile repair depots for emergencies or routine service as needed.
• Use standard disk images for baseline supported software to reload all that is needed and speed correction of software or operating system corruption.
• Lock desktop systems and servers down to prevent tampering and corruption of the configurations.
• Develop centralized approaches to troubleshooting and correction of simple problems, e.g. use of remote access and use tools.
• Improve and increase staff proficiencies in all tasks so they can more efficiently and quickly handle their work.
• Regularly review issues with how support is handled with existing systems and ‘brainstorm’ ways to handle them with your staff.
• Sit down with your staff or that of your COE or a neighboring larger district or supporting technical association and discuss the support requirements and how they might be solved.
• Seek the help of a qualified consultant to help you define what the issues are and ways of solving them.

The above is not an exhaustive list by any means. It is a place to start. The best approaches are sometimes, but not usually, obvious. So, approach this like any other engineering problem. Define it (requirements), explore solutions, test feasibility/adequacy, design a solution, put it into place, then verify and validate it is working.

7.4.3 ACQUIRE AND ESTABLISH SUPPORT

Once support has been designed to meet the requirements it will need to be acquired. How this is done will depend on what it is needed. Support acquisition planning rests with the system project manager. This may be efforts both internal for staffing and purchases or external by support contractors.

Support establishment needs to be coordinated with other project activities so it will be ready when needed. Do not forget staff technical training.

It is good planning to acquire support staffing prior to any installation work so they can be part of these efforts and use them as learning processes. It also acquaints them with the problems so if they resurface, they will be recognized immediately.

7.4.4 SUPPORT VERIFICATION AND VALIDATION

Verification of support is done to assure that what was designed is established and working. Validation is the determination that what is in place is performing what is needed. Both efforts are needed to establish a baseline for future analyses of support.

To be able to accomplish verification is a matter of reviewing the Support Plan and making sure all that was in it has been accomplished and is working. Validation of support requires that support data be collected and analyzed against the requirements to determine if they are, in fact, being met. Some of the types of data needed are referred to in Section III. These may vary somewhat depending on what is used as support and what is available to track the process. See Section VIII for more on support data and
measurements.

7.4.5 OPERATIONAL SUPPORT & ASSESSMENT

Support validation starts with deployment but is an on-going task throughout the Production Use (Operational) Phase of system life. This will be discussed further in Section VIII.

7.5 TRAINING

Establishing training for deployment can take a considerable amount of time. It could, in fact, take more time to train end-users and staff than it does to acquire and install the system. Never rush a deployment. A system is useless if those who need it do not know how to operate it. Additionally, it can create negative experiences with the system which will be hard to overcome when training does finally get accomplished.

If support is going to be accomplished in-house then technical staff will need to be trained. If end-users will be trained by in-house staff then they will need time to become acquainted and use the system so they are proficient with it.

The training approach, structure, content and timing need to be studied and planned deliberately as part of the System Development Plan. This is a major task and is the responsibility of the system project manager.