Data Center Management and Efficiency

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INTRODUCTION

The efficiency and security of data processing operations is a major concern to corporate data processing managers.

To assess their data center's performance, management often conducts a review of the following areas: standards and procedures, operational work flow and control, scheduling, data security and access control, equipment utilization, and environment.

If the data center management and staff understand the concerns of upper management and the information that is needed, the operations review can proceed more smoothly, and the results can be more beneficial to the entire organization.

Corporate direction for data center management focuses on control issues, automation procedures and the gray area in between. The data center manager reviews the operations and interprets corporate objectives to the operations staff. Because this article focuses on the concerns often overlooked by the data center manager, it can be a useful check list for improving daily operations as well as preparing for a data center operations review.

STANDARDS AND PROCEDURES

Data center managers should verify that standards and procedures exist and are enforced. These written rules are the controls; they should include:

* Ensuring proper timing in running programs and jobstreams.
* Inserting changes into production runs; entering run dates.
* Using correct data for programs; accesses the correct data files.
* Protecting data and programs from accidental or intentional destruction.
* Specifying methods of physically moving input and output.
* Scheduling work and getting work rerun in the event of an error.
* Keeping records of work performed and session logons.
* Determining and recording sufficient resources for the work.
* Performing maintenance and general housekeeping associated with the operation of the data center.

The data center manager should ensure that formal standards exist for systems development and maintenance, program and system testing, file conversion, program and system change control, library operations, computer operations and documentation.

For each aspect of standards and procedures, your installation can implement procedures using automation software as shown in the following chart.

Task Description	Controlled Operation	Automated Controls	Controlled Automation	Automated Operation
Run Programs	User Task	User with Scheduler	User who Schedules	Scheduling Software
Change Jobstreams	User Task	User with Editor	User who Edits Jobs	Job Change Software
Verify Data File	User Task	User with File Scan	User who Scans Files	File Scan Software
Monitor Jobs	User Task	User with Jobstream Monitor	User who Monitors Jobstreams	Jobstream Monitor Software
Control Master Files	User Task	User with File Copy	User who Copies files	File XFER Software

OPERATIONAL WORK FLOW AND CONTROLS

The data center manager should investigate specific items in this area, including whether:

* Input data from other departments is complete and entered on time.
* The data center keeps job accounting and session logon information.
* Job accounting information is evaluated and used by management.

Error control procedures should also be reviewed. Specific questions to ask include:

* Is anyone notified in case of a production processing error?
* Are batch processing errors and logon violations documented?
* Are error statistics accumulated or ignored?
* Are errors followed up on so that they do not recur?

The data center manager should also confirm that downtime is reported and statistics compiled. A log of late reports and jobs should be maintained.

There should be a formal communications channel between data center operations and other departments; operational tips and other advice should be passed to all operators.

All problems encountered at the computer, as well as any action taken to prevent their recurrence, must be documented. Operators must also receive feedback on reported problems.

The data center manager scrutinizes output report distribution and disposal and determines whether:

* All reports have been distributed to the proper user departments.

* Procedures have been established to control the distribution of sensitive output.

* Procedures exist for disposing of confidential reports when they are no longer required.

Finally, the data center manager should ensure that jobstream run instructions are kept up to date.

SCHEDULING

Efficient and effective scheduling is extremely important in providing a high level of reliability and predictability to data center operations. The data processing manager should determine whether:

* Daily processing activities are scheduled and a daily contingency schedule is maintained.

* Actual run times are recorded for batch programs and jobstreams.

* This data is used to calculate expected run times for a given day.

* Expected run times are compared with actual execution time to ensure that processes have not terminated abnormally.

* Unscheduled runs are supported by a work request or other written authorization. Schedule deviations should be documented and followed up on by a supervisor.

* User-submitted jobs are recorded to allow forecasting of future schedules, resource requirements, and special processing considerations.

Scheduling software enforces controls and totally automates the data center operations. Manpower reductions can result depending on implementation. A chart on scheduling appears below:

Task Description	Controlled Operations	Automated Controls	Controlled Automation	Automated Operation
Create Schedule	User Task	User with Streamer	User who Schedules	Scheduler Software
Monitor Run Times	User Task	User with Job Log	User who Logs Jobs	Monitor Software
Job History Report	User Task	User with Job Log Data Base	User who Compares Job Logs	Data Base Report Generator

DATA SECURITY AND ACCESS CONTROL

Data base and master file information should be protected from unauthorized access or loss. Employees must be instructed about their responsibilities concerning confidential information. Management should periodically review and update controls and security provisions relating to data.

Live production programs should be physically separated from development. The staff should be prohibited from running test programs against live files, and operations personnel should be denied access to sensitive data files.

Secured file management is not limited to source and object control. Data center managers should ensure that procedures have been established for:

* Accepting and transferring programs from development to production.

* Program library changes are formally approved.

* Acceptance testing of changed programs before transference to the production libraries.

* Updating production documentation after changes.

To maintain security, operators should be prohibited from renaming or transferring programs without supervisory approval. Internal labels must be used from all data and program files.

Passwords and lockwords should be used to protect accounts, users, data files and port access. Passwords, lockwords, dates and

constants should be introduced at run time, eliminating the need to hard-code sensitive data in jobstreams.

Data security and access control software can bring automation to the data center; with automation you can expect a more efficient system operation as summarized in the chart below:

Task Description	Automated Controls	Controlled Automation	Automated Operation
Separate development and production areas	User who moves files	User with file mover	File Librarian Software
Restrict live file access	User who locks files	User with lockwords	Protected File sets to User Sets
Approval pre-step to Production Move	User who moves files	User with file mover	Automated File move after Approval
Project/memo notes Related to Changes	User who completes forms	User with text editor software	Online dialogue requesting memo text at save time

EQUIPMENT UTILIZATION AND EFFICIENCY

Once it has been determined that the entire data processing department is following a properly implemented set of standards and procedures, the data center manager should review equipment utilization.

The data center manager should collect raw data from the system log files in order to report the following information:

* How much machine time is spent on reruns?
* Whether reruns are analyzed?
* Whether certain jobs are especially susceptible to reruns?

With reported resource utilization information, the data center manager should check that the full multiprogramming capability of the system is being used. It then follows that multiple jobstreams should run concurrently, if there are no data file bottlenecks.

The data center manager then reviews whether many jobs can be restarted without rerunning the entire job. Jobstep tracking and restart software should be implemented for efficient data center operations.

ENVIRONMENT

The data center manager should review the work space to ensure that it is adequate for the number of employees. The environment should be neat, and supplies should be easy to locate.

Auxiliary items located outside the computer room, such as bursters and de-collators, should be accessible for the flow of work in the department. Tapes, discs and other storage media should be stored in a closed, fire-protected, limited-access area.

RECOMMENDED COURSE OF ACTION

The data center manager should make the organization aware that the following steps can enhance the operations review:

* Providing the data center management with as much information as possible.
* Implementing software systems that leave clearly defined audit trails.
* Keeping accurate records, log files and file history information.
* Maintaining formal written standards and procedures.
* Implementing an effective data security system and access control facility.

Following the data center manager's recommendations and procedures for operations can yield an efficient, secure and automated data center.