BMC CONTROL-M
WORKLOAD OPTIMIZATION
TIPS & TRICKS FOR ADMINISTERING BMC CONTROL-M

BMC Communities Site for South East User Group
About Cetan Corp

Cetan Corp is a leading independent provider of Workload Automation and Cloud solutions. It has helped hundreds of clients ranging from growing, innovative companies to some of the globe’s most recognizable and iconic brands leverage their IT assets as a key enabler to achieving the strategic goals of the organization. Cetan Corp has over two decades of expertise in the Workload Automation space and has a proven record of success helping its clients implement solutions that increase productivity, improve the quality of key business services and promote business growth.

- Founded 2007
- Veteran Owned Small Business
- Native American Owned Minority Business Enterprise
- Corporate HQ: Chesapeake, VA
- GSA Schedule Holder; #GS-35F-163BA
BMC Control-M Workload Automation
Framing the Discussion – CIO Priorities

BMC Software Workload Automation Survey

- Deploying new apps: 71%
- Expect growth in business and transaction volume: 66%
- Initiative to increase automation and reduce costs: 47%
- Deploying new hardware: 31%
- Other: 2%
BMC Control-M - Recent Enhancements

- Automated Agent & Client Deployment
- GANTT & Execution Details on Active Jobs
- Global Calendars
- Integrated HA
- Simplified User Experience
- Enhanced Power – Speed & Performance
- Self Service
- Mobile Access
- Workload Change Manager
- Version Management
- Workload Policies
- Usage Reporting
- Application Integrator
- Expanded Conversion Capabilities
- JCL Verify
- Simplified Installation & Upgrades

Application Plug-Ins
- Backup
- SAP BO
- Informatica
- Cloud
- Oracle BI
- IBM Cognos
- IBM Datastage
- Hadoop

Automation API
Developer’s Workbench

Keeping Users First
BMC Control-M - Upgrade to Control-M 9

- Dramatic performance improvements for NEWDAY processing
- Improved Control-M Server throughput
- Faster Gateway communication
- Faster Global Condition processing
- Enhanced job management (multi-day job flows, etc...)
- Internal ‘HA’ Support
  - Significant resource reduction when coupled with Postgres DB versus Oracle
LEVERAGE THE CLOUD WITH CONTROL-M

Full Control-M stack on public cloud in just a few clicks

- AWS Marketplace

Coming next:

- Azure Marketplace
BMC Control-M – Architecture, Administration and Management

* Take Advantage of the three tier architecture
* Consider where users are accessing the workload from and adjust components like web server and GUI server.
* Consider how developer’s and non-production users will access the system according to which tools or components of Control-M they can use best.
  * Workload Change Manager
  * Archival
  * Automation API
  * Developer’s Workbench
* Implement Workload Service Management
* Start now
* Become proactive, then predictive, then adaptive
* Integrate with IT Service Management to automate accountability and become part of the IT Team.
* Implement best practices and standards that simplify automation and managements
* Encourage compliance through the business value of ease-of-use, higher quality and greater customer satisfaction along with lower support costs
The following details standard BMC Control-M utilities that should be implemented per the frequency outlined below. The following utilities should be run as the local administrator ID for the machines where the Control-M Enterprise Manager and Control-M Server reside.

**Recommended Enterprise Manager Housekeeping Utilities**

- **purge_xalerts** - Purges old alerts from the Exception Alerts Table  
  - Recommended Run Frequency: Monthly

- **purge_runinfo** - Purges old data retained by Forecast  
  - Recommended Run Frequency: Monthly

- **erase_audit_data** - Cleans old audit data  
  - Frequency: Monthly

**Recommended Control-M Server Housekeeping Utilities**

- **ctmjsa** - Compiles job statistics, and frees table space  
  - Recommended Run Frequency: Daily

- **ctmcontb** - Deletes old Prereq Conditions  
  - Recommended Run Frequency: Daily

- **ctmlDNS** - Creates and loads a file containing Prereq Conditions that will not be automatically created by any scheduled task  
  - Recommended Run Frequency: Daily

- **ctmlog** – Deletes obsolete records from the log file  
  - Recommended Run Frequency: Daily
Optimization: Keep Your House Clean (Reporting)

- **Jobs Not Done** (either waiting to run or waiting to be restarted).
- **Jobs Restarted** (job that were restarted that ran successfully or that are still executing).
- **Jobs Deleted** (in the context of Control-M these would be jobs that were, removed from the schedule after loading, bypassed for execution or that were flagged as ‘Force Completed’).
- **Job on Hold** (jobs that were placed on hold or that were otherwise updated so that they would not execute).
- **Audit Log** (listing of all changes made to workload either in the Active Environment or against the permanent schedules).
- **SLA Analysis** (lists all BIM services and their completion status: Ended Late, On Time or Did Not Complete)
- **SLA History** (lists all BIM services and their complete status for prior processing periods)
- **Forecast Workload Report**
- **Forecast Trend Analysis Report**

Unless otherwise noted all reports should be generated automatically on a daily basis via BMC Control-M Report jobs and should be produced in a PDF format. In addition to being accessible via the BMC Control-M Report Facility, all produced reports should be automatically emailed (via the Report Jobs) to the Production Control team and all end user stakeholders.
The following details standard BMC Control-M utilities that should be implemented per the frequency outlined below.

**Recommended Control-M for z/OS Housekeeping Utilities**

- **CTMJSA** – Accumulates job execution statistics
  - Recommended Run Frequency: Daily

- **CTMHCLN** – Removes expired entries from the Control-M History File
  - Recommended Run Frequency: Daily

- **CTMSLC** – Removes expired job definitions (Based on the ‘Don’t Run After Date’) from the Schedule Library
  - Recommended Run Frequency: Monthly

- **IOACLCLND** – Removes expired conditions from the IOA Conditions file
  - Recommended Run Frequency: Daily

- **IOALDNRS** – Identifies and loads conditions to the Manual Conditions File for IN conditions that will not be met by jobs loaded into the current schedule
  - Recommended Run Frequency: Daily

- **IOAVERFY** – Produces utilization reports for key IOA and Control-x product components
  - Recommended Run Frequency: Weekly

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*Keeping Users First*
Optimization: Deploy Self Service

- Full deployment of Control-M Self Service will enable the reduction of clients to the end users
  - Reduces load on network and GUI Server

- Reduces dependence on Production Control staff
  - Enables business users to initiate pre-authorized workload automation services without tying up IT resources
  - Variable input using business terms

- Revisit Control-M Sizing (concurrent users)
Load on Production Control without Self Service...

- Please run job ABC123
- Can you put job ABC456 on hold?
- Is my job finished now?
- I need my job rerun
- Did my job finish yet?
- Well, when will it be done?
- Why did it take five rings for you to answer?
- No, I told you to cancel job ABC456
- Can you put job ABC456 on hold?
- Please run job ABC123
- Did my job finish yet?
- Is my job finished now?
- I need my job rerun
- Why did it take five rings for you to answer?

Keeping Users First
Batch Output

With increasing workload volumes from an ever-growing array of platform and application types, organizations are faced with the task of managing more batch job output than ever before.

This places more pressure on organizations to manage operational data (EQ – system logs, audit trails) and the actual output of the jobs that makes an efficient use of storage and is:

- Secure
- Accessible to Stakeholders
- Easy to Search
- Retained based on organizational and legal requirements

20,000 jobs per day. Each job generates 50 lines of ‘operational data’ and 200 lines of output for a total of 5,000,000 lines of information.

Retaining that information for one year results in the need to manage up to 1,825,000,000 lines of data.
Optimization: Tame Your Archives

- Fully integrated with Control-M Clients
  - The Workload Manager
  - Control-M Self Service
- Secured based on the user’s Control-M permissions
- Actions are tracked via standard Control-M auditing / tracking facilities
- Stand-alone DB to provide optimal performance
Implement SMART Folders & Workload Policies

SMART folders should be implemented to replace standard Control-M Schedule Tables where possible.

The SMART folders still serve to act as a container for one or more jobs but they are also designed to allow jobs to share common criteria for job execution, scheduling, resource controls and post-processing actions thus eliminating the need to define and maintain those elements and enforce standards at the job level.

SMART tables also allow for variations of job schedules to be automatically addressed via the ADJUST CONDITION flag that will automatically adjust the relationships between jobs when DAILY, WEEKLY, MONTHLY variations exist. This will allow you to reduce the number of job definitions and simply the application of future changes.

SMART folders can be treated as a unit within CONTROL-M, further simplifying the relationships between jobs or logical groups of jobs.

Utilities that automate the conversion of existing tables to SMART folders are available. It is recommended that the conversion activity take place following the application of the best practice standards.
Optimization: Review Your Sizing Requirements

Control-M Workload Manager

<table>
<thead>
<tr>
<th>Environment</th>
<th>Enterprise Manager</th>
<th>Enterprise Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of concurrent users</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Number of BIM services/jobs</td>
<td>80 - 250</td>
<td>80 - 250</td>
</tr>
<tr>
<td>Number of Self Service Users</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Number of Data Centers</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Number of jobs defined</td>
<td>15,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Number of jobs in AIF</td>
<td>80,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Number of job iterations</td>
<td>80,000</td>
<td>80,000</td>
</tr>
</tbody>
</table>

Recommendations

<table>
<thead>
<tr>
<th>Local Database</th>
<th>External Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Size</td>
<td>16299 MB</td>
</tr>
<tr>
<td>Memory required</td>
<td>5646 MB</td>
</tr>
<tr>
<td>CPU rPerf value</td>
<td>9.50</td>
</tr>
<tr>
<td>SPEC Int_rate 2006</td>
<td>29.59</td>
</tr>
<tr>
<td>Network loading</td>
<td>1582 MB</td>
</tr>
<tr>
<td>Average network Speed / Sec</td>
<td>19 KB/sec</td>
</tr>
</tbody>
</table>

Control-M Server

<table>
<thead>
<tr>
<th>Environment</th>
<th>Control-M/Server</th>
<th>Control-M/Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of jobs defined</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Number of jobs in AIF</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Number of job iterations</td>
<td>50,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

Recommendations

<table>
<thead>
<tr>
<th>Local Database</th>
<th>External Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Size</td>
<td>1669 MB</td>
</tr>
<tr>
<td>Memory required</td>
<td>3506 MB</td>
</tr>
<tr>
<td>CPU rPerf value</td>
<td>12.65</td>
</tr>
<tr>
<td>SPEC Int_rate 2006</td>
<td>39.42</td>
</tr>
<tr>
<td>Network loading</td>
<td>0 MB</td>
</tr>
<tr>
<td>Average network Speed / Sec</td>
<td>0 KB</td>
</tr>
</tbody>
</table>

It is recommended to revisit the actual user and workload metrics for your Control-M environment to ensure that the environment is sized properly. Implementation of BIM and Self Service as well as changes in the composition of your schedules can significantly influence the amount of CPU, Memory and Disk required to support the environment.
Optimization: PARM Settings

1. **ExecuteConfirmedJobs** – This parm is set by default to assume that jobs will never be confirmed, so both BIM and Forecast show jobs with confirms will not run. Change to a value of “2” to assume job will be confirmed at the average start time. The parm needs to be set for both BIM and CTM Forecast.

2. **Output_Window_Size** – Update to 132 from the default of 80. This is a Control-M Server parameter.

3. **Not_Ordered_Job_Alert** – Set to “2” from the default of “0”. It eliminates the extraneous alert that not all jobs were ordered. This is a Control-M Server parameter.

4. **AutomaticOrderMethod** – Change to “0” from default of “1”. Especially for upgrading, as this makes any new folder that you create set to automatically order every day. This is the totally opposite from the way pre-CTM 8 versions behaved.

5. **HandleAlertsOnRerun** – Set to “1” from the default of “0”. This one is more personal preferences but if you are actually using the alert window in Control-M this will handle the alert automatically.
Optimization: PARM Settings

History for Control-M Logs

**Control-M Enterprise Manager**

MaxOldDay: “7” from default of “2” (Amount of days to keep the logs)
MaxOldTotal: “21” from default of “4” (Amount of iterations to keep total)
*This means that you can restart the Control-M Server up to 3 times in a day and still retain the current day logs for a week.*

**Control-M Server**

ctm_menu —> 5 —> 3 —> 2 —> n —> 6 —> set to 7 (Amount of days to keep the logs)

ctm_menu —> 5 —> 3 —> 2 —> n —> 7 —> set to 7 (Amount of days to keep the Output)
Parameter in config.dat file OUTPUTRETN

This also depends on disk space on the Control-M Agent servers and can also be set per Control-M Agent using the parameter SYSKEEPDAYS in the Control-M Agent CONFIG.dat
Optimization: PARM Settings

**EMAIL: Control-M Server Parameters**

Removing the OrderID from the sent EMAIL from Control-M Server. This is if the job sends an email from the actions ON-DO set the parameter MAIL_ADD_SUBJECT_PREFIX = N

**Agent Discovery - Control-M Server Parameters**

Parameter to stop the Control-M Server from discovering the Agents. HOST_AUTODISCOVER = N
Optimization: PARM Settings

**CYCLIC Bypass:**

Jobs might not re-run at the start time defined by the **Interval** parameter. This occurs when you set the **Interval FROM** parameter to **START**, and the job cannot be submitted at the defined start time for any reason, such as missing condition, resource, or the job is on Hold.

To define the starting point of the interval for the next job run, set the **INTERVAL_FROM_START_MODE** parameter in the **config.dat** file to one of the following:

**REGULAR**: The next interval will start according to when the previous run actually started.

**TARGET (Default)**: The next interval will start according to when the previous job should have run if there were no delays.
Optimization: AFT and Third Party Tools

Certain FTP Servers (Connect Direct) can be configured so that once the file has been queried or accessed, the file is deleted.

When AFT retrieves a file via SFTP it first does a "stat" (or other file access) of the specific file to confirm that it is available and contains data prior to actually retrieving the file. This can cause a false positive on the FTP server for the third party tool and the file can be deleted as a result before the Control-M AFT job is able to actually retrieve it.

To resolve add the following line to the <agent home>/data/FILE_TRANS.dat. Make sure to leave one empty line at the end of the file:

SFTP_IFEXIST_CHECK 1

This will remove this check prior to transfer allowing the transfer to complete successfully.
Optimization: z/OS Considerations

✓ Review xxxPARM members.
✓ Perform a DSLIST for all IOA & CTx related files.
✓ Execute the IOAVERIFY utility with VERIFY FILE ALL parameter.
✓ Execute the IOAVERIFY utility with VERIFY SYSTEM GENERAL parameter.
✓ Copies of all known IOA & CTx related exit source.
✓ Function review of all known KSL scripts used by CTM support or end user community.
✓ Resource utilization reports for all IOA & CTx STC’s.
✓ Concurrent User Load Metrics.
✓ Peak Job Processing Metrics.
CONTROL-M ON THE CLOUD

Simplified Cloud provisioning & configuration
• Support Hybrid environments
• Installation supported on AWS
• Database as a service support:
  • Amazon AWS RDS

Coming next
• Installation supported on Azure
• Azure SQL
Thank You

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