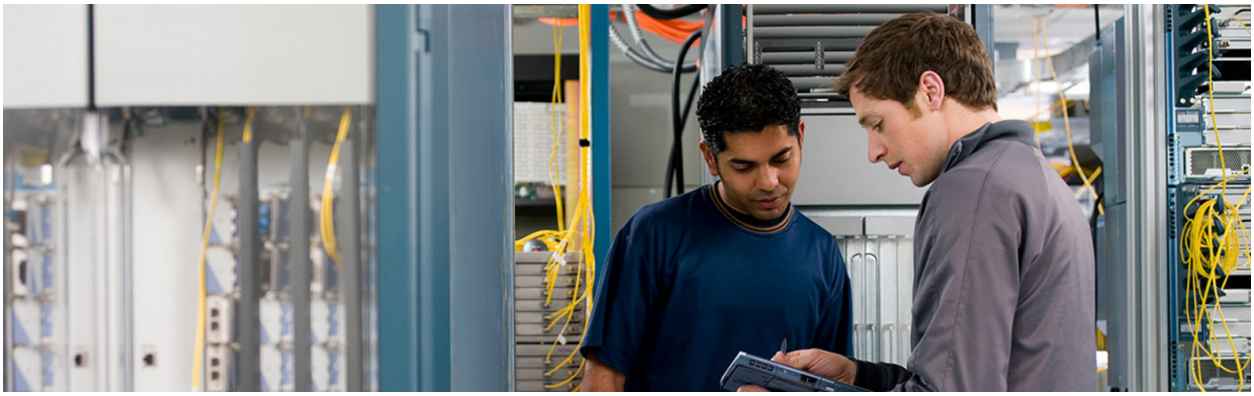
IT Automation: Evaluate Job Scheduling and Run Book Automation Solutions



What You Will Learn

Businesses increasingly use IT automation tools to meet the challenge of managing their data centers. This document describes two types of IT automation software: enterprise job scheduling and run book automation (RBA). It explains:

- How each solution helps to improve efficiency and reduce risks
- When to use each solution and when to combine them

This document addresses organizational leaders and IT staff.

Choosing the Right Solution for the Job

The volume and complexity of data center tasks is generally expanding, and businesses are placing high demands and increasing expectations on their data and business processes. An important way that IT addresses these challenges is with IT automation. IT must use tools to automate a wide variety of processes in ways that not only improve efficiency, but also reduce risk and costs. Job scheduling automation and run book automation (RBA) are two important approaches that can help meet IT challenges. To get the most benefit from them it is important to determine the scenarios best suited for each approach.

Today IT deploys both job scheduling and RBA tools to manage many types of operational workload. Evaluating needs and defining the right solution for any given task is a complex, time-consuming undertaking. This document explores the environmental uses of job scheduling (batch processing) and RBA (IT process automation) and defines the conditions for choosing one solution over another. This document also notes when it is appropriate to run a combination of both to gain immediate benefits for business operations and continuity.

Enterprise Job Scheduling

Today's enterprises are run by the services supplied by a wide range of application software. Whether providing financial accounting, customer relationship management (CRM), or highly complex inventory and just-in-time delivery systems, these applications and the physical and logical environments they run on need constant operational maintenance and configuration monitoring. Job scheduling solutions define, schedule, and manage application jobs, which are the individual steps required to deliver these services.

In a typical job scheduling environment, there is a centralized scheduling platform with a set of on-demand technologies to support its functions. The IT operations and core scheduling teams interact with the scheduler through a client tier or a Web interface. Traditionally, job scheduling solutions performed their work using platform-specific agents, including Microsoft Windows, UNIX, Linux, and mainframe operating systems. However, in the past five years, there has been a shift toward managing jobs by directly connecting to a targeted application. This shift requires writing plug-in modules that connect through vendor-supplied APIs to interact directly with enterprise resource planning (ERP) and CRM solutions, such as SAP, Oracle E-Business Suite, PeopleSoft, and JD Edwards. Connections to custom-developed applications are generally managed through the use of web services integrations or the delivery of jobs onto enterprise service buses (ESBs) through Java Message Service (JMS), or by creating connections to Java applications by using JavaBeans.

There has also been an effort to integrate and schedule jobs using the latest business intelligence, data warehouse, and extract, transform, load (ETL) applications. These solutions require integration of database activities. The solutions process data from multiple applications across the enterprise to deliver the business insight required to make the right strategic decisions at the right time. Managing dependency logic and automating job step sequencing are critical to the delivery of relevant and timely information for strategic decision making.

Job scheduling solutions can also manage file delivery, backup, and storage processes. More recently, job schedulers have been integrated with virtualization solutions and certain cloud services that have the capability to schedule jobs in a virtualized environment.

Keeping track of the internal and external job operations environment requires job schedulers to have formal operational reporting tools that deliver information about critical job run activities. This process includes delivery of information to specific targets or administrators through file, email, database, and simple network management protocol (SNMP).

Job Scheduling Automation

Job scheduling automation allows data center administrators to automatically define and run a set of business processes between different applications. This automation provides control and visibility over an entire job processing environment. Workflows - the logical description of a series of jobs - integrate and orchestrate business processes from distributed logical and physical application stacks and from various ERP systems.

A number of environmental and job-specific criteria can be automated. One of the most important is the timing of when a job and workflows will run. Job scheduling tools can manage complex business calendars. Jobs can be set to run in relation to specific business needs, such as end-of-quarter financial reporting or biweekly payroll runs. Different business units have different needs and operate on different calendars. Automation tools must be able to meet those needs, yet be flexible enough to manage any time-based situation.

In conjunction with time-based schedules, job schedulers must also launch jobs using event-based triggers. Triggers can include any system event, environmental actions, completion of other jobs, file variables, email triggers, database changes, and even changes in a virtual environment. A business process workflow may have a time window, but it may also need a specific file to be delivered from an outside partner or vendor to execute successfully. In this case, jobs can be defined to have a dependency on some other event, action, or file before running. Jobs can also be managed based on specific environmental variables, such as the availability of a resource stack or specific network bandwidth. Event-based automation provides a means of removing latency from batch business processes and allows IT to be more responsive to the evolving needs of the business by delivering complex workflows faster.

Because job schedulers perform such a vital role by automating critical business processes, they must be able to generate alerts and take subsequent automated actions when something unexpected happens within the processing environment. A scheduler’s alert and recovery management capabilities should be flexible enough to handle a wide

range of potential errors. They should also be extensible enough to identify and manage events that the user chooses.

Automated recovery features and their corresponding alerts should respond differently to different types of events. In fact, alert management and autorecovery often need to work in conjunction. In a typical scenario, a job may fail, which would then initiate some type of recovery action and also notify a designated administrator of the failure. This notification may be in the form of an email, an XML page, or an SNMP message sent to a central management console. This messaging function should allow acknowledgment of the alert so that the job scheduling tool is informed when the appropriate person has received it.

Typically, a disposition occurs at the end of a job run. Alerts can be triggered to notify IT staff, and files may need to be printed, saved, or deleted. Another important set of automated tasks is status outputs, which can include logs, reports, exit status, and the results of jobs generated by complex workflows.

From a process-delivery perspective, after the scheduling environment is defined and jobs are created and running, IT operations staff can monitor all job activities and events. Job scheduling automation allows IT to focus on defining, running, and recovering complex application jobs. Its greatest benefit is to provide IT with effective tools to deliver accurate and timely application processing demands from various business units.

In scenarios in which job scheduling automation manages specific business process functions, such as financial or inventory ERP jobs, RBA looks at the entire data center environment from a holistic and preventive orchestration perspective. Before looking at what RBA does, consider the larger issues of managing a complex data center.

Managing Complex Data Center Operational Processes

In addition to delivering services to various business units, IT is responsible for the day-to-day operational readiness of those services. That responsibility includes a number of critical functional elements, such as the hardware and software stack (machine, memory, OS layer, and applications), database administration, network administration, data storage and recovery, and security surrounding the entire infrastructure.

According to Forrester Research, the combination of human error and application-layer errors accounts for 80 percent of data center outages. These errors include testing errors, ineffective change management, configuration problems, undocumented or improperly documented procedures, failures in knowledge transfer, failure to obtain approvals, and other violations of company policy. The following examples provide an overview of how human and manual processes can affect IT operations.

Lack of Proper Approvals

Managers usually approve critical process execution so that each action creates an audit trail. However, the approval process may change as administrators assume new roles. Many companies expand the number of processes that require approval or levels of approval during end-of-month, end-of-quarter, and end-of-year processing. Staff members who are unaware of these changes could likely fail to get the proper approvals.

Inconsistent Process

Staff members may use different processes, which can result in inconsistent outcomes. Clearly, consistent process execution delivers better, more predictable service, while inconsistent process execution results in erratic service, slower problem resolution, and wasted IT resources.

Inability to Monitor and Refine Process

A primary objective in managing an IT department is to improve process efficiency and effectiveness. An organization that is unsure of a process being followed or the conditions necessary for its success will find it difficult to make improvements.

Delegation of Routine Tasks

If IT departments can securely delegate processes (even those requiring administrative privileges), productivity can be improved and expensive resources can be directed toward developing and implementing technical innovations.

Failure to Consistently Perform Preventive Maintenance

Numerous processes should be run regularly to locate emerging problems. If this task is left undone due to inconsistent process adherence, the result will be degraded service or service outages.

Use of RBA tools can eliminate these human and procedural errors, freeing high-value resources for mission-critical innovation projects.

Run Book Automation in the Data Center

Automation of jobs and their associated workflows has the goal of creating a system in which no human involvement is needed for time-based and event-based batch processing. The best day in an operations center is one in which job scheduling runs perfectly and there are no reruns, faults, or errors. RBA, however, assumes some form of human involvement at critical points in the operations infrastructure management process and attempts to guide administrators through a set of predefined steps to deliver the intended outcome.

RBA is a process orchestration methodology that encompasses the entire IT infrastructure. Whereas job scheduling automation focuses on delivering services to business units in the form of job execution output, RBA focuses on the health and efficiency of the IT operations stack by tracking and reducing mean time to repair (MTTR) and increasing mean time between failure (MTBF) values and averages - statistics that describe data center reliability and stability.

Another RBA deliverable consists of processes that help provision computing resources and manage resource utilization. RBA allows IT to transition from managing discrete applications and devices to delivering tightly integrated enterprise services using a series of documented, step-by-step instructions. Automation can be instrumental in attaining the proper balance between process and flexibility by helping organizations achieve greater operational accuracy.

Incident response times are also a crucial factor in IT operations service delivery. While many data centers use advanced monitoring and performance tracking tools, the remediation steps are usually performed using manual procedures that introduce errors and operational risk into the recovery processes. The following examples illustrate how RBA can automate infrastructure procedures to provide better control, greater visibility, and ultimately, reduced costs.

Corrective Action

RBA tools automate commonly repeated processes for incident and alert diagnosis and resolution. Automated response can take many forms, such as sending an email to the correct administrator or invoking complex remediation steps that can be fully or partly automated to guide administrators through a series of step-by-step processes. This type of automation can reduce alert floods, empower frontline operations, and reduce escalations.

Preventive Maintenance

The day-to-day routine of managing recurring software maintenance and health check diagnostics usually consists of impromptu processes that can be complicated by unnecessary human intervention. RBA tools can eliminate the error-prone management of many of these recurring tasks, significantly increasing the efficiency of administrative staff and reducing human-induced errors.

Change and Compliance Orchestration

From a business-continuity perspective, RBA solutions can integrate with Information Technology Infrastructure Library (ITIL) domain of change and configuration management, service decks integration, and quality control gates.

RBA helps IT manage change uniformly across all infrastructure tiers for application configuration enforcement and process compliance, and it provides an automatic audit trail.

Process Step Orchestration

RBA can deliver end-to-end processes across IT tools and departmental silos. This orchestration reinforces IT best practices, provides smooth integration across supporting tools, and provides unified visibility and control.

Security Access

When error remediation issues arise and manual intervention is necessary, administrators may need credentialed access that they have not been granted. An RBA tool can be configured to allow item- or task-specific controls. This provides task rights to staff without providing root access. By automating security privileges through the use of highly specific process flow authorization, IT staff can act immediately without having to locate and secure approvals for impromptu access rights. MTTR metrics and staff overhead will quickly be reduced due to faster error recovery. Also, security can be automated in the form of preventive management. Processes can be defined to eliminate unauthorized configuration changes, so that environments can be locked down to let the RBA tool, with its robust security model, define who has access to which processes and which steps each staff member can perform.

Change Management

Manual and case-by-case processes for change management may take weeks for end-to-end system refreshes, patch integrations, middleware changes, storage changes, allocation of network resources, or just deployment of the server application database. Centralized visibility of process integration is necessary for data center infrastructure automation. The deployment of many different specific solutions results in disconnected processes, so deploying a single-pane RBA solution to orchestrate these processes is critical.

Environmental Triage

RBA can add great value to service operations. A typical IT environment has a variety of software, hardware, and network resources. Often these environments, connected to a management console, are full of alerts and events continuously delivered to the service desk console. RBA allows administrators to prioritize incoming events by categorizing and automatically intervening in low-level actions and escalating only those incidents that need administrator-level intervention. RBA can then be designed to alert the right administrator and take corrective action.

Unlocking Valuable Staff Time

Domain experts are constantly distracted by the needs of operations administrators. Those individuals with deep expertise would benefit from a sophisticated RBA tool to reduce MTTR and MTTF and to decrease the effects on customers, because their collective knowledge would be built into the RBA content library. These experts could then deliver more value to the business by concentrating on mission-critical innovation projects.

Managing Virtual Resources

The move to virtualization has actually created more complexity in the data center, resulting in increased risk levels. RBA can help reduce the human errors involved in managing preventive automation tasks and routine resource provisioning. RBA tools can also perform automated configuration tasks through streamlined release and deployment.

Choosing the Right Tool for the Job

Following are a few examples of typical job scheduling automation and RBA solutions in practice.

The traditional realm of the job scheduler has been the automation of enterprise and custom ERP and CRM process workflows. Automation may include management of inventory supply chains for a manufacturer or retailer or quarter-end closing of the general ledger in a technology company. An enterprise job scheduling solution will easily connect to physically and logically distributed systems, various enterprises, and custom application stacks, while managing detailed schedules over multiple time zones.

Another job scheduling example is the management of a market data system in which a variety of financial end users receive multiple feeds from external data sources. A job scheduling solution automates all these processes to get the right data to the right place at the right time.

Finally, job schedulers are ideally suited for managing data integration (ETL) processes, while delivering the output to downstream data warehousing and business intelligence reporting tools. Job scheduling solutions are the right tools to promote this kind of activity, especially when it is performed in conjunction with upstream ERP workflows. In this case, the job scheduling solution is delivering an automated enterprisewide workflow solution.

Examples of RBA and service operational process automation include incident management, infrastructure maintenance, and deployment provisioning. RBA helps data center administrators isolate the location of incidents within a complex application environment residing in a complex infrastructure.

RBA also handles internal and business unit operation service requests. Internal requests may include SAP system copies, health checks, and system refreshes, or, in an Oracle E-Business environment, the automation of daily and weekly checks, diagnostic routines, backups, and management of database space.

Where the Choice Between RBA and Job Scheduling Automation Is Not Clear

Depending on how the lines of operational responsibility are drawn, an operations team may be responsible for preventive health checks and configuration management using RBA tools, whereas service delivery, application availability, and job-run error management may be managed by a job scheduling team. As a result, the choice of which tool to use is not always obvious.

The following are examples in which the decision between RBA and job scheduling automation is ambiguous, where either solution may be the right choice, or where (in complex situations) both tools are necessary to enable a data center operating at optimal efficiency to deliver on business unit requests with speed and accuracy.

Scheduling a Backup Operation

Data backup has typically been managed by job scheduling automation tools. In a complex data center, these tasks may be managed with RBA solutions if they involve daily or routine storage management processes.

Disaster Recovery Planning and Execution

Both job scheduling and RBA tools may be necessary for managing large enterprise disaster recovery procedures. RBA may take an administrator through the provisioning steps, and a job scheduler could manage application output steps. Typically, though, RBA solutions manage complex disaster recovery processes.

Cloud Orchestration and Virtual Machine Resource Orchestration

When a virtual data center is up and running, typically core and stack configurations are constantly changing. Virtual machines are added, application stacks are provisioned, and resources are used on demand or taken offline, depending on the defined load balancing or efficiency utilization parameters. In this case, both solutions may be necessary to optimize both automated job runs and administrator-aided configuration maintenance and monitoring using RBA tools.

If an environment has different domains of control, operational silos, or security constraints, the ownership of the process and what is being managed changes. How and when to automate these processes must be considered.

Improving Operational Excellence by Automating IT Processes

Cisco® Tidal Enterprise Orchestrator is designed to be the foundation on which to standardize, unify, and automate best practices for IT infrastructure processes that are used in complex, heterogeneous data center environments. Using automated maintenance, deployment, infrastructure service requests, and incident management run books, Cisco Tidal Enterprise Orchestrator frees staff to address strategic business objectives.

By automating the infrastructure management process and putting automated best practices in place, IT can reduce the time and effort spent on repetitive maintenance procedures, housekeeping tasks, and support routines. This approach enables IT departments to control costs, improve efficiency, and speed service delivery to the business.

Managing Enterprise Workloads with Automated Job Scheduling Solutions

Cisco offers an extremely easy-to-use enterprise job scheduler, Cisco Tidal Enterprise Scheduler, for completely automating even the most complex batch processing across the enterprise. With an intuitive GUI, Cisco Tidal Enterprise Scheduler is a powerful solution that enterprises can use as a standard because it offers a scalable, distributed architecture that operates across platforms, such as Microsoft Windows, UNIX, Linux, IBM z/OS and OS/400, HP OVMS, and many others. It also transparently integrates with leading applications from SAP and Oracle, including PeopleSoft and Oracle E-Business Suite, leading business intelligence and data warehousing solutions, and many commonly used industry-specific applications, such as those used in banking, retail, and other industries.

Used in some of the most demanding data centers in the world, Cisco Tidal Enterprise Scheduler job scheduling software can be implemented quickly to support rapid streamlining of batch processing and contribute to overall data center efficiency.

Whether an enterprise needs to automate workflows within a highly complex and distributed application environment or requires automated incident management, infrastructure maintenance, and deployment provisioning, Cisco offers the right solution.

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