Cisco Tidal Enterprise Scheduler

Automation is critically important to organizations that are focused on unifying and standardizing data centers. Automation technology supports unified data center initiatives because it helps simplify operations, reduce costs, and promote business flexibility.

Introduction

Workload automation is an important category of automation that gives organizations the control and visibility necessary to operate today's dynamic data centers. Automating business process workloads is essential to complex data centers, because it helps them operate more efficiently and reliably.

The combination of Cisco Nexus® high-performance switches and Cisco Unified Computing System™ (Cisco UCS®) servers addresses the challenges of these high-performance data processing environments and the business and operational requirements of evolving data centers. Cisco® Tidal Enterprise Scheduler (TES) has been the defining standard that transparently automates these critical interdependent job streams. The Cisco scheduler delivers a high degree of proven job scheduling usability, scalability, and breadth of coverage.

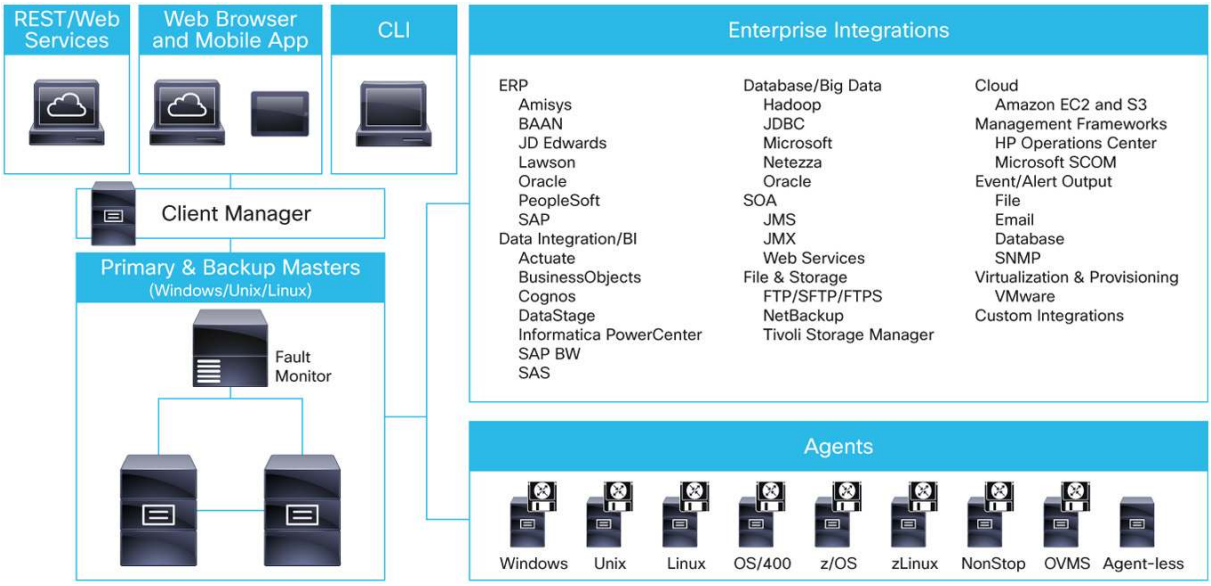
This proactive and holistic approach to data center architecture and workload management is an alternative that dramatically reduces risks and inefficiencies. Cisco TES reaches across heterogeneous environments as an infrastructure service platform, providing end-to-end management of critical business processes. With this enterprise-wide job scheduling solution that automates complex processes and adapts to changing environments, IT managers can quickly add business value by improving service-level quality, reallocating resources to business-critical projects, and supplying the timely and accurate data processing results necessary for strategic decision making.

Product Overview

Cisco Tidal Enterprise Scheduler is an automation platform for cross-application and cross-platform enterprise workloads, batch job scheduling, and data and application integration. Cisco TES can easily configure and run scheduled batch workloads and event-based business processes, integrate the commercial and custom applications these processes use, and determine which tasks to run, as well as where and when to run them, without the need to manage scripts or customize existing tools. Additionally, the enterprise scheduler provides a single view and point of control over business processes and the jobs they comprise.

Based on a highly scalable multitier Java architecture, Cisco TES can scale to deliver the most demanding SLAs, because it is capable of handling hundreds of concurrent users, managing thousands of connections, and running hundreds of thousands of jobs a day. The enterprise scheduler offers a distributed management architecture that works across many popular OS platforms and integrates with major enterprise applications and technologies (Figure 1). The enterprise scheduler can also manage complex application integrations that connect through web services and enterprise service bus (ESB) protocols. Cisco TES can be implemented quickly, allowing users to maximize time to value, build momentum across their organizations, and quickly simplify their entire workload processing environment.

Figure 1. Support for Cross-Application and Cross-Platform Workload Management



Features and Benefits

Cisco TES offers a range of features that work together to meet IT's need for enterprise visibility, scalability, and coverage, as well as the daily creation and management of complex workload schedules.

By automating jobs with Cisco TES, IT can positively affect SLA delivery in the following ways:

- Increase efficiency by simplifying complex workloads and batch processing across the distributed enterprise
- Enhance SLA reliability and reduce expensive downtime through intelligent scheduling, alert automation, and a comprehensive high-availability failover platform
- Improve services and competitive advantage by accelerating mission-critical business application processing
- Support a shift from a reactive to a proactive mode of operation by complete workload visibility, predictive analytics, self-service job implementation, environmental awareness, and automated error remediation
- Improve comprehensive auditing and tracking information in support of compliance with IT policies and procedures
- Improve IT staff productivity through web and mobile clients and customized self-service portals

Extensible and Scalable Design

Cisco TES gives IT managers a global view of their enterprise workloads through a single “pane of glass,” regardless of how many applications or systems are touched by the defined workload. The enterprise scheduler accommodates multiple levels of dependencies and complex groupings, making it possible to automate extremely complex job streams, while scheduling them through a hierarchy of standard and custom-defined calendars and programmable events.

Cisco TES uses a multitier architecture to provide a single solution that meets enterprise needs for performance, extensibility, and scalability. Separate architecture layers provide a stable, extensible framework, allowing it to handle punishing workloads reliably.

The enterprise scheduler master focuses primarily on storing, managing, and implementing job schedules. User interaction is orchestrated by one or more client managers. This n-tier architecture and the decoupling of core functions provides scaling both up and out, allowing organizations to support a large number of concurrent users and jobs without degradation of performance.

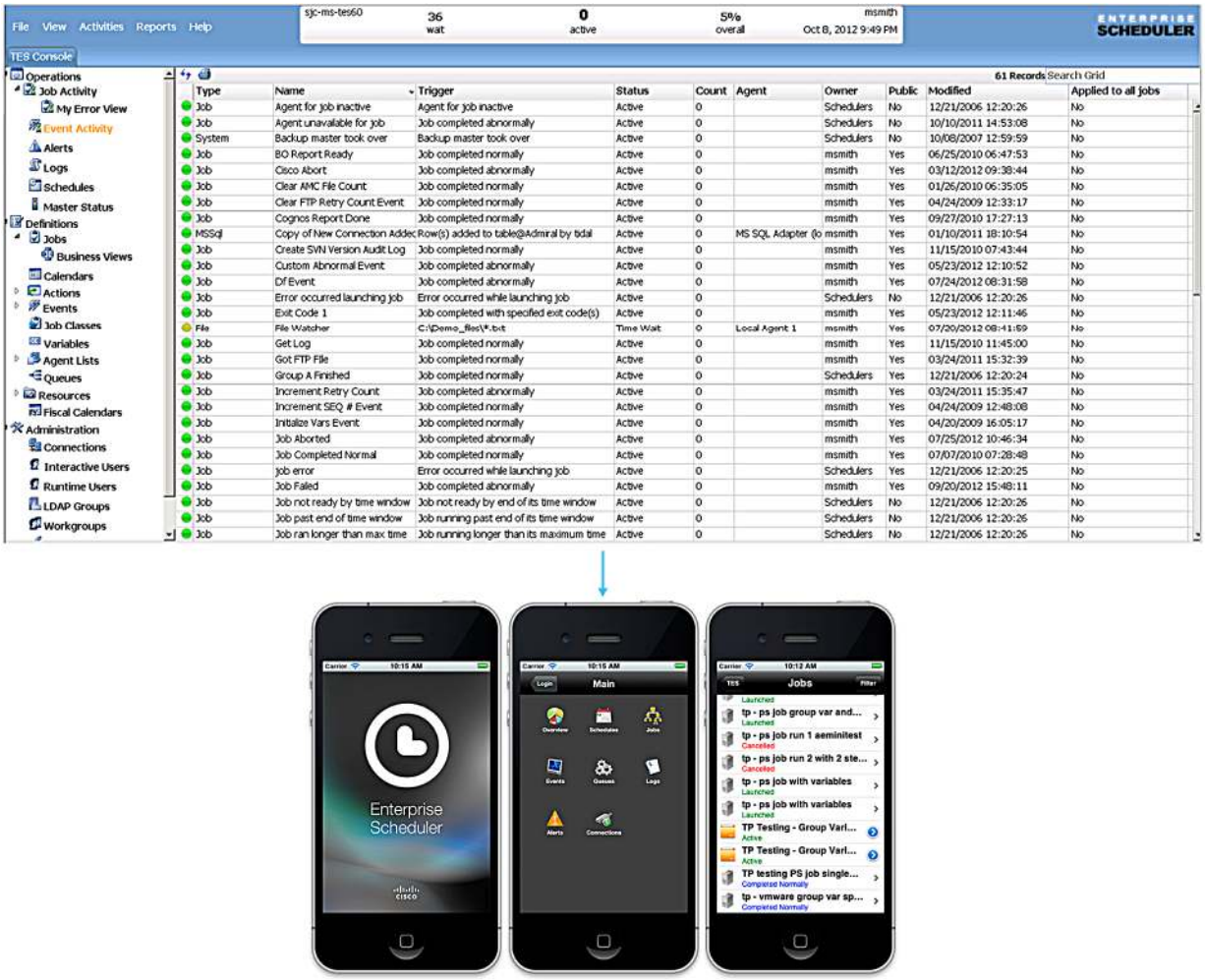
Jobs and workloads are defined and managed through an intuitive interface where administrators can define the many dependencies within enterprise business processes (Figure 2). Users can also access detailed performance statistics for all jobs, past and present, and monitor processes as they occur. The scheduler supports real-time event and alert management, maximizing uptime and SLA delivery levels.

Cisco TES allows control of jobs and management functions from mobile devices. The Cisco TES mobile app lets you manage adapter and agent connections, override, hold and stop, and release and resume jobs. Management capabilities also include the ability to filter and view jobs, alerts, events, schedules, connections, queues, and logs.

Granular Workload Resource Management

Cisco TES gives IT managers and administrators the ability to define and schedule workloads in ways that will not exceed their business processing resources or impact other job runs. Cisco TES allows for the prioritization of jobs, job groups, or entire business-critical workloads, and can also configure individual servers or processing groups to allocate the necessary resources to complete SLAs on time. And if unplanned jobs are introduced or unforeseen environmental events arise, Cisco TES can adjust capacity using its adapters for virtualized compute resources or manage public cloud servicers and storage resources.

Figure 2. A Web Interface with Mobile Management: Single Point of Control for Enterprise-Wide Workload Automation



Enterprise Application and Database Coverage

In the heterogeneous and virtualized environments that characterize today's enterprise data centers, flexibility and reach are critical. Cisco TES automates the scheduling of traditional packaged applications, as well as complex, decoupled, and often widely distributed service-oriented architecture (SOA) applications that frequently run on different OS platforms.

The enterprise scheduler integrates transparently with leading enterprise applications and databases using specifically targeted application adapters. Adapters for scheduling custom Java applications and web services connections extend the reach of enterprise scheduler, offering fine-grained control and simplified access.

The scheduler can also manage process integration through the use of agents running at the OS level. Cisco TES supports many popular operating systems, including Windows, UNIX, Linux, z/OS, OS/400, NonStop (NSK), and OVMS, and offers agentless adapters for Secure Shell (SSH) and Windows systems.

Increasingly, businesses are using job scheduling and batch process automation technologies to integrate the business operations of their partners and customers. The enterprise scheduler streamlines inter-enterprise data exchange through a powerful, script-free solution for file transfer, including File Transfer Protocol (FTP), SSH File Transfer Protocol (SFTP), and File Transfer Protocol SSL (FTPS). Database activities and process steps can also be automated in Microsoft, Oracle, or any Java database connectivity (JDBC)-compliant database environment, even running process steps on various data warehouse appliances.

Big Data and Business Intelligence

From data collection to storage, retrieval, analysis, and reporting, business processing depends on the ability to move data between files, applications, databases, and business intelligence solutions. For many years, advances in networking, storage, and data processing applications kept pace with the growing amount of enterprise data and the growing needs of business processing. But with the accelerated growth of unstructured data such as voice, text, and video streams, the traditional data processing approach breaks down. Analyzing the torrent of chat and text streams to measure customer sentiment is a different exercise than running a sales report against a Structured Query Language (SQL) database. Today's challenge is capturing unstructured data and quickly manipulating it to meet a variety of business goals and deliver valuable information to the end business user.

Cisco TES provides a comprehensive platform on which to manage business intelligence solutions and offers granular management of big data applications such as Hadoop. Cisco TES offers a Hadoop Adapter that gives detailed control over data loading and flow management (Sqoop and Data Mover), the Hadoop core data processing (MapReduce), and the data interface layer (Hive) that allows input of SQL-like data query and analysis commands. The Cisco TES Adapter for Hadoop delivers enterprise capabilities for defining, scheduling, and managing Hadoop jobs, such as multiple layers of dependency mapping and nesting of parent and child jobs, drop-down parameter selections, granular alerts and automated job rerun functionality, resource awareness for workload prioritization, and predictive analytics to eliminate SLA delivery guesswork.

Cisco TES is also well suited to managing data integration, database, and data warehouse activities, as well as the report generation and delivery tasks that comprise integrated business intelligence solutions. The enterprise scheduler supports business intelligence solutions from Cognos, SAP Business Information Warehouse (BW), SAP BusinessObjects, Informatica, and others. Each interface has been carefully developed and tested to work transparently with each application. Combining these third-party application partnerships with Cisco's workload automation solution has the added benefit of providing a low-risk path for transitioning big data "science projects" from test to production environments.

Managing Virtualized and Cloud Resources

With IT moving increasingly toward virtualization and decoupling of the cores, OS, and application stacks, whether inside the company firewall or outside in public cloud environments, the enterprise scheduler is an ideal solution to automate the management of these virtual computing environments. The scheduler can automate not only the tasks performed by specific virtual machines within the firewall; it can also manage Amazon EC2 instances and S3 storage buckets and the data movement in and out of these cloud storage resources.

Cisco Tidal Enterprise Adapter for VMware makes it possible to perform a wide array of management tasks on individual hypervisors or across hypervisors using the vCenter server. Virtual machines can be powered on or off and suspended and resumed; snapshots can be managed, resources adjusted, or VMotion activities performed.

All these activities can take place as job components in line with business process flows. This unique capability makes it possible for the state of a virtual environment to be balanced and optimized, helping to guarantee performance and availability of resources for essential business process steps.

Cisco Tidal Enterprise Adapter for Amazon EC2 and S3 gives you the ability to automate these public cloud resources. Managed Amazon EC2 resources include start, stop, and delete instances, and managing Amazon Machine Images (AMIs) and Elastic Block Store (EBS) volumes. Cisco TES also allows the management of S3 storage buckets and data copy and move.

Intuitive User Interface

The enterprise scheduler provides an intuitive browser-based user interface that delivers all aspects of administration, definition, and operation of the schedule through a single pane of glass. Job creation, stop and start, calendaring, fallback, and event dependency mapping can all be achieved within this interface, which has the same look and feel as in previous versions of the product. From a single console, users can view the workloads for past, current, and future job runs in real time, allowing disparate systems to be centrally managed without scripting. Out-of-the-box integrations also support a remotely accessible command-line interface (CLI) for UNIX, Linux, and Windows systems.

The scheduler mobile app also provides job control capabilities allowing override, hold and stop, and release and resume commands. Cisco TES management capabilities also include the ability to filter and view adapter and agent connections, jobs, alerts, events, schedules, queues, and logs.

Because the enterprise scheduler management tools are accessible through a browser and security access is managed by Lightweight Directory Access Protocol (LDAP) and Active Directory integration, control of specific processes can be quickly distributed to various workgroups and individuals in the data center and even given to business unit IT managers for self-service job planning and implementation.

Delivering Self-Service Management

Now you can eliminate the need for 24-hour staffing because a business end user might make a request to change, cancel, or delay running a business process. You can deliver higher service levels to your business end users without them needing to escalate job insertions or changes to IT for such impromptu requests.

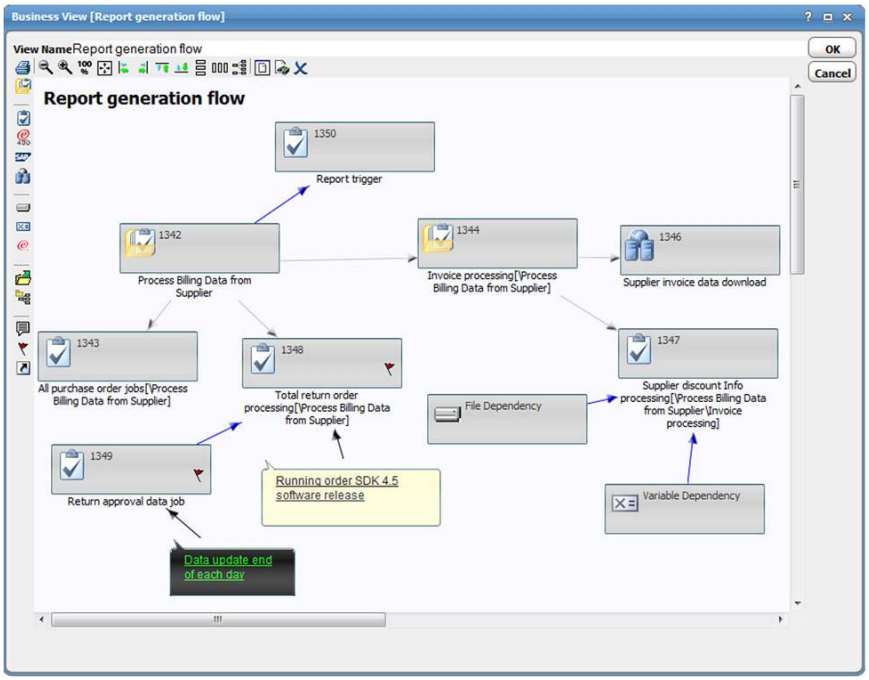
Cisco Workplace Portal for TES (Figure 3) provides business users (and IT administrators) continuous controlled access to approved services without the need to allocate additional IT staff. Business users manage jobs and receive services without IT involvement and without specialized skills because the processes and complexity are abstracted through a user-friendly web portal.

Figure 3. Self-Service with Cisco Service Portal for Tidal Enterprise Scheduler

Business Views

Aligning IT with business goals is critical. In order to accomplish this, IT must understand how specific workflow tasks relate to an overall business process. The enterprise scheduler supports this understanding through its business views (Figure 4). These views graphically display the tasks included in a business process, their dependencies, and their status. Using business views, IT staff can define, understand, and control not only individual job steps, but also the overall workflow process.

Figure 4. Graphical Business View for Displaying the Tasks in an Entire Business Workflow



IT Policy Concurrence

The enterprise scheduler can also document, store, and retrieve run book processes for managing critical job streams. Each job definition can contain operational instructions and restart, reset, and rollback procedures, making it possible for IT staff to consistently follow documented best practices. IT operations and information technology infrastructure library (ITIL®) process frameworks can be supported through interfaces with a complementary set of application performance monitoring and analysis tools, as well as third-party data center management products from HP, Microsoft, BMC, and other vendors.

Enterprise-Class APIs

The enterprise scheduler provides a comprehensive set of application program interfaces (APIs) that allows access to core scheduling and operational activities. These APIs are provided as a set of web services defined with the representational state transfer (REST) and Web Services Description Language (WSDL) access methods, and they provide compatibility with a wide range of SOA implementations. These web services are exposed from the enterprise scheduler client manager, making them scalable and capable of delivering peak performance even under heavy workloads. In addition, they are designed to support transparent failover using the same approach as for all other application interaction points.

The enterprise scheduler API architecture is closely aligned with the functions of the target application as a whole. As a result, the enterprise scheduler client manager supports all external application interactions. The client manager continuously routes changes and requests for information through the enterprise scheduler master, providing accurate scheduling information.

Batch and On-Demand Processing

With the push toward round-the-clock business operations, the batch processing window has all but disappeared, requiring improved scalability and more efficient workload management. The enterprise scheduler is designed to accommodate batch and on-demand job processing, providing comprehensive support for the traditional date and time scheduling model, as well as complex, event-based, real-time processing.

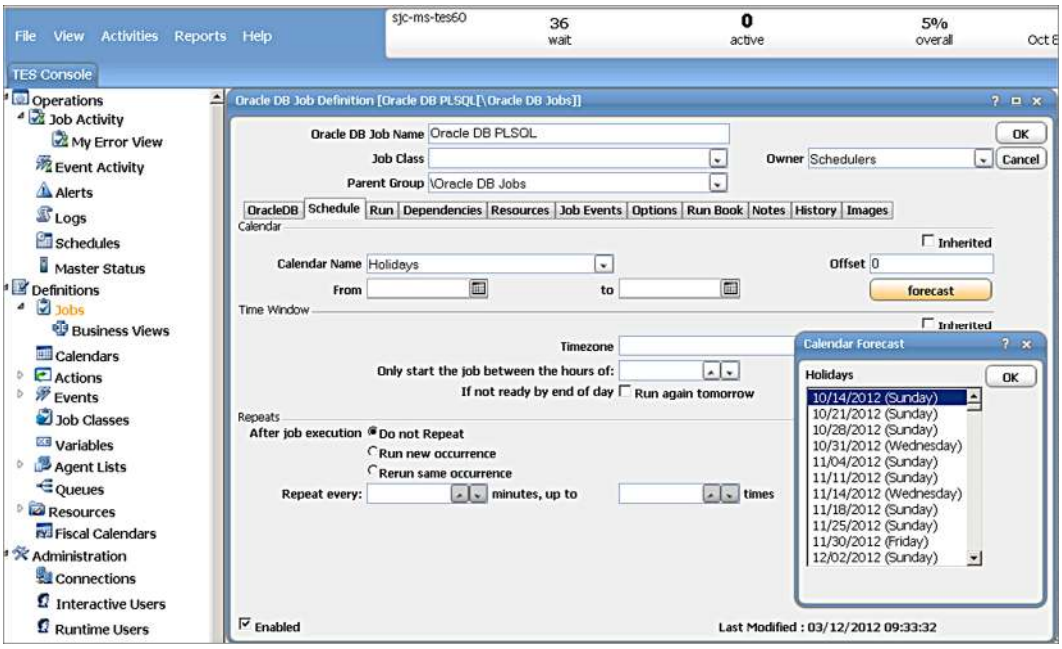
Comprehensive Calendaring

The enterprise scheduler provides comprehensive functionality that accommodates multiple enterprise calendars, while permitting calendar combinations that meet specific date-driven business requirements. It can support rules that govern complex scheduling needs based on a hierarchy of dependent calendars, including the ability to manage calendars configured to accommodate global workdays, holidays, and unplanned date dependencies. In addition, the enterprise scheduler effectively manages the dependencies created when tasks must not only be accomplished on a specific date but also in a particular order or in conjunction with other tasks.

The enterprise scheduler is delivered with more than 60 predefined workday and financial calendars that can meet the most complex processing needs. When users need to modify or make an impromptu change to a calendar, these changes can be made dynamically without requiring a recompile of the schedule, and the new templates can be cataloged and saved for future use.

Enterprise business processes are often global in nature, with various steps of the process running in different parts of the world, which operate on various time zones. Cross-time-zone scheduling is a factor because modern businesses operate in multiple theaters and must be aware of time zone idiosyncrasies, such as daylight savings time changes on irregular intervals. Cisco Tidal Enterprise Scheduler can account for these situations and give the user the ability to specify the time zone on a per-job basis (Figure 5). Doing so will help ensure that the job will launch correctly no matter where the job resides, and that it will run as expected.

Figure 5. Defining Job Schedules Based on a Variety of Preconfigured Calendars



Event-Based Processing

In addition to calendar-based scheduling, the enterprise scheduler can dynamically introduce jobs–and entire business processes–into a schedule when triggered by business or system events (such as the arrival of a file) from a wide range of application adapters and platform-supported agents. The ability of the scheduler to respond to events removes latency from batch processing and allows IT staff to respond quickly to evolving business needs.

The enterprise scheduler provides script-free support for event-based scheduling. Events supported include the following:

- Job triggers (such as system events, exit codes, and jobs running longer than expected)
- File arrival and changes
- Database changes (without requiring creation of database triggers)
- Email
- Simple Network Management Protocol (SNMP)
- Variables (managed internally or externally)
- Enterprise application, business intelligence, data integration (extract, transform, load [ETL]), and data warehouse events that are communicated from the various adapters and agents

Flexible Monitoring and Alerting

To simplify managing alerts, the enterprise scheduler also offers a specialized alert console that allows users to see all defined alerts within the scheduling system, view their status, and manage their behavior. It can also send alerts to browser-enabled devices for anytime, anywhere status connectivity.

The scheduler alerts users to a wide variety of potential events, often acting in conjunction with the ability to configure autorecovery steps. If a job fails, the enterprise scheduler can initiate a recovery action, send an email to the appropriate owner, generate a message to the central console, or trigger an incident to an IT support technician through the appropriate ITIL-oriented operations systems. Ease of use and flexibility are primary, as well as the ability to generate specific alerts without custom scripting.

Comprehensive Security and Audit Capabilities

The enterprise scheduler offers granular security management through comprehensive LDAP and Active Directory integration. Security policies (and their controls) are tied to enterprise security management tools and processes. Cisco TES makes it possible to control access to scheduling functionality as a whole or to specific jobs, events, or actions on an individual user or workgroup basis.

To further support alignment with enterprise security management policies and processes, the enterprise scheduler creates audit trails that allow operations personnel to monitor and control the scheduling environment, a crucial requirement in today's rapidly changing production and regulatory environments.

Reporting and Analytics

Making informed decisions about the performance of business processes to support SLAs is a major concern in today's complex IT environments. Efficiently managing complex workloads and enhancing the accuracy and reliability of job processing have a significant positive impact on meeting business demands.

Business managers, IT executives, scheduling managers, and front-line staff all need ongoing access to timely and accurate information to understand the performance of their scheduling environment and to comply with IT policy and audit requirements. Cisco Tidal Enterprise Scheduler delivers out-of-the-box reporting features that provide insight into the enterprise-wide scheduling environment through in-depth historical data. This helps IT managers develop strategies to improve job scheduling performance.

In addition to its detailed native reporting features, Cisco Tidal Enterprise Scheduler integrates with Terma Labs JAWS Historical and Predictive Analytics. You can get historical, real-time, and predictive job run analysis to help business end users, IT executives, scheduling managers, and IT staff gain greater visibility into the performance of their workload automation environments and the SLAs that comprise the business processes. Rapid access to accurate job stream reports and critical path analytics can support IT in detecting issues proactively, so that service levels are not compromised. Insight provided by these sophisticated analytics modules supports the auditing and compliance process and also promotes new strategies to help continuously improve SLA delivery. These analytics solutions also deliver predefined reports and allow you to create custom reports and gather the data needed by IT and business managers to troubleshoot, trend, and analyze job scheduling performance across the enterprise.

Reduce TCO with Cisco Tidal Enterprise Scheduler

For most IT organizations, TCO analysis has become mandatory in all new project decisions. Reducing the cost of ownership of existing capital and operational resources through increased efficiency and higher utilization rates is a major performance driver. The enterprise scheduler delivers outstanding benefits in the following categories, making it possible to meet internal SLAs on a more consistent basis and reduce resource TCO:

- **Integrated solution design:** Allows operations to be in production in days through components that install quickly and work together transparently

- **Broad coverage:** Simplifies scheduling and management of jobs in enterprise-wide, heterogeneous environments, even if some jobs are outside the firewall
- **Intuitive management console:** Helps operations staff to quickly define, deploy, and track job processes
- **Swift notification and recovery capabilities:** Reduces downtime from hours to minutes
- **Automated analysis:** Supports close management of complex dependencies and helps users quickly resolve workflow bottleneck problems

Companies in a variety of industries rely on the enterprise scheduler to keep their daily operations running smoothly. The enterprise scheduler, combined with Cisco's performance management solutions, can deliver even greater levels of automation and optimization to the data center than conventional scheduling and performance management solutions.

Table 1. Cisco Tidal Enterprise Scheduler Features

Feature Summary
• Distributed, multitier architecture • Easy-to-use management interface • Fault tolerance and high availability • Scalability to handle both departmental and enterprise-wide workloads • Cross-platform, cross-application scheduling and dependency support • Single view for enterprise-wide workflow automation • Optimization for high-volume processing in centralized or virtualized computing environments • Workload balancing of the processing environment for granular resource management • Private and public cloud processing and storage management • Transparent integration with major business applications and support for scheduling across a wide range of big data, business intelligence, data warehouse, and data integration environments • Ability to define and run jobs on Java Message Service (JMS) and Java Management Extensions (JMX) Java applications platforms as well as Simple Object Access Protocol (SOAP) and REST-based web services environments • Integrated FTP, SFTP, and FTPS scheduling support • Web-based, mobile app, and CLI access • Sophisticated business calendar and event processing • Nested schedules to manage the dependencies in a long sequence of tasks • The ability to design and run jobs without managing scripts • Role-based security and tight integration with LDAP and Active Directory • Native, granular reporting tools with integration into Terma Labs JAWS Analytics

Major Requirements

Although specific planning and sizing is straightforward, actual requirements can vary by enterprise depending on the environment and type of coverage needed. Specific requirements information is easily obtainable after an initial conversation with a product expert. The enterprise scheduler can be installed and deployed by users or by engaging Cisco Services. Information is also available online through Cisco Knowledge Services.

For More Information

For more information about this and other Cisco products or services, visit http://www.cisco.com/go/workloadautomation.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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