Tivoli® software

Workload automation and service execution: challenges and solutions for today.
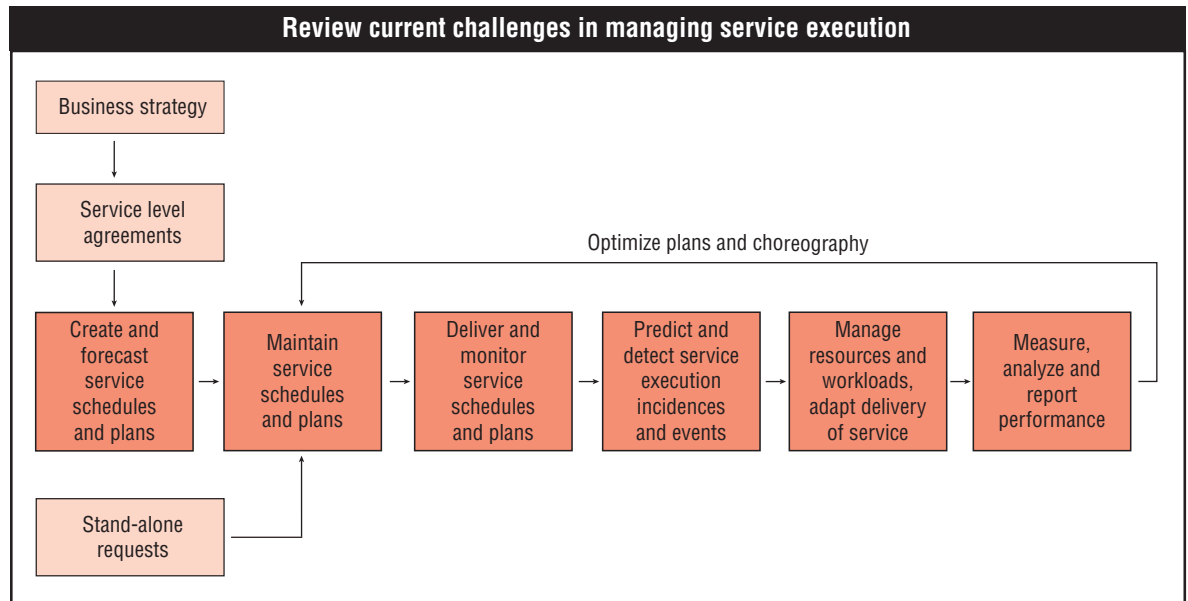
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Overview

Service execution is the process for delivering operational services to the IT infrastructure and the enterprise. In effect, it is telling applications and systems what workloads to run, when to run them and where to run them throughout the organization in a consistent, predictable fashion. While the service execution process is straightforward, it is exceptionally difficult to manage. The right management tools should be able to:

- Support business processes and policies.
- Enable planned changes to business processes and the IT infrastructure.
- Adapt to unplanned incidences in the IT infrastructure.
- Maximize workload velocity.
- Optimize the utilization of IT resources.
- Adhere to stringent service level agreements (SLAs).
- Ensure adherence to compliance and governance requirements.

Traditional management tools such as job schedulers, load balancers and cluster managers can automate some of these activities, but they leave IT organizations without the ability to automate, dynamically manage and optimize service execution activities end to end, across the enterprise.

These challenges can be effectively addressed by dynamic, end-to-end workload automation solutions that provide a virtual point of control to implement standardized service execution processes and support a service oriented architecture (SOA). Solutions should be designed to respond quickly to service demands and changes in the IT environment, balance computing costs and service levels, and improve utilization of IT capacity.

Review current challenges in managing service execution

Business strategy

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Service level agreements

Optimize plans and choreography

Create and forecast service schedules and plans → Maintain service schedules and plans → Deliver and monitor service schedules and plans → Predict and detect service execution incidences and events → Manage resources and workloads, adapt delivery of service → Measure, analyze and report performance

Stand-alone requests

The service execution process

As shown in the figure above, service execution is the process for delivering operational services. The overall process represents the "central nervous system" of the enterprise. In effect, service execution tells applications and systems what workloads to run, when to run them and where to run them throughout the organization.

While the service execution process is straightforward, it is exceptionally difficult to manage. Management tools must be able to:

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- Optimize the utilization of IT resources.
- Adhere to stringent SLAs.
- Ensure compliance.

Additional difficulties arise from trying to manage complex, heterogeneous applications and systems as well as processes across organizational silos. Finally, IT organizations — already limited in resources — must somehow deal with a growing number of mixed, interdependent and often unpredictable workloads that need to be scheduled in real-time, near-real-time and batch modes.

Historically, enterprise-wide service execution processes have not been well defined. Furthermore, traditional management tools such as job schedulers, load balancers and cluster managers have enabled IT organizations to only manage workloads for individual IT resources, or a cluster of resources. These traditional management tools ultimately leave IT organizations without the ability to automate, dynamically manage and optimize service execution activities end to end, across the enterprise. This paradigm has led to the use of multiple workload management environments within the enterprise. As a result, IT organizations find it challenging to:

- Provide a virtual point of control to implement standardized service execution processes.
- Implement standardized, scalable workload management activities or processes.
- React quickly to changes in the IT environment.
- Properly balance computing costs and service levels.
- Optimize workload plans and choreography to increase workload velocity and improve utilization of IT capacity.
- Provide adequate reports on overall workload performance across applications, systems and organizational groups.

Recognize the consequences of inadequate management

The lack of efficient management for service execution can result in significant problems at both the technology and business levels.

Consider this example: a Web services invocation triggers a stream of dependent, real-time and batch workloads. These workloads span enterprise resource planning (ERP) applications and databases running in open systems, as well as messaging middleware running in mainframe systems. With individual scheduling environments for each application, middleware and system, it is difficult to understand and optimize workload processing performance across the entire service execution process. It is also difficult to monitor workloads by exception and to proactively address and understand the impact of workload errors from an end-to-end standpoint.

These technical problems can lead to a slowdown or degradation of business processes — and that can result in customer frustration, customer churn, complaints from business partners, damage to the brand and company image, lost sales and other consequences that impact the bottom line and reduce the overall competitiveness of the business. These problems can also lead to inefficient use of existing IT resources, creating a strain on some resources and the underutilization of others.

Address today's challenges in managing service execution with IBM dynamic, end-to-end workload automation solutions

Understand the critical requirements for successful service execution management

IBM believes that today's challenges in managing service execution can be addressed with dynamic, end-to-end workload automation solutions. First

of all, let's look at some of the specific capabilities that are essential to successfully managing service execution:

• Monitoring and promotion of critical workloads ahead of less-critical workloads as needed

Proper monitoring of virtualized resources from a single point of control provides real-time visibility into hundreds or even thousands of workloads and their dependencies. Monitoring should deliver consolidated, timely information and reports that help IT respond in a dynamic fashion to workload incidents and problems as well as rapidly changing workload requirements.

• Matching workloads to the best available resources

The ability to utilize a virtualized resource pool increases flexibility and efficiency, plus it lowers complexity and total cost of ownership. Eliminating the resource dependency from workloads helps drive the intelligent matching of workload requirements and IT resources, and thereby helps increase the utilization of application resources and workload velocity.

• Dynamic response

Capabilities should include the dynamic triggering and optimization of plans based on historical trends, dynamic provisioning of resources to meet demand and the dynamic starting and stopping of resources to meet demand.

• **High availability**

Built-in fault tolerance and support for high-availability clusters can help ensure continuous delivery of services even in the case of server or network failure. Automatic alerts should notify administrators so they can take the appropriate actions before issues become problems that affect performance.

• **Autodiscovery of resources**

Autodiscovery detects newly provisioned servers automatically and adds them to the pool of possible targets. This capability helps reduce the labor-intensive process of discovery across complex environments, keeps service views current with dynamic IT environments, improves IT productivity and supports accuracy.

Provide a virtual enterprise-wide control point

In addition to the capabilities listed above, a virtual enterprise-wide control point should be included to facilitate integration with other management products and across an organization's diverse set of existing resources. With this integrated point of control, the organization can provide standardized, end-to-end workload automation across multiple environments, including distributed, peer-to-peer, grid, mainframe and mixed environments. Visibility should encompass current and future job executions, resources, incidents and performance issues across local and remote systems.

Incorporate service oriented architecture

As a final requirement, workload automation solutions should be supported by SOA, an open framework that enables IT organizations to easily build, deploy and integrate processes, including IT and business workload processes. SOA can be key to dynamically reconfiguring the delivery of services according to business demand, helping to foster innovation and better align

IBM Tivoli workload automation products enable IT organizations to establish a virtual control point to build and automate a scalable service execution process across the enterprise

IT to business goals. SOA also enables open interfacing for the simplified integration of workload automation into the application and systems management paradigms.

Optimize service execution management with IBM Tivoli products

The IBM Tivoli® workload automation family of products allows IT organizations to establish a virtual control point to build and automate a consistent, predictable and scalable service execution process across the enterprise. These products consolidate enterprise-wide batch and event-triggered workloads that span multiple applications and systems, helping IT organizations efficiently control and manage cross-enterprise workloads.

The Tivoli workload automation portfolio includes:

IBM Tivoli Workload Scheduler and IBM Tivoli Workload Scheduler for z/OS® provide advanced workload planning and choreography services, along with extensive calendar and event-triggering services for real-time, near-real-time and batch workloads. They include open Java™ 2 Enterprise Edition (J2EE™) and Web services interfaces to allow IT organizations to consolidate custom applications and services into the service execution process.

IBM Tivoli Workload Scheduler for Applications extends Tivoli Workload Scheduler software by providing extensive awareness and interfacing to SAP, PeopleSoft and Oracle business applications. This allows IT organizations to consolidate ERP application workloads into the service execution process.

IBM Tivoli Dynamic Workload Console is a component of Tivoli Workload Scheduler, Tivoli Workload Scheduler for z/OS and Tivoli Dynamic Workload Broker. Tivoli Dynamic Workload Console is a light, powerful, user-friendly, Web-based single point of operational control for your entire workload automation network. Tivoli Dynamic Workload Console allows for single sign-on and authentication to one or many schedulers, is highly scaleable and provides real-time monitoring, management and reporting of enterprise workloads.

IBM Tivoli Dynamic Workload Broker further extends Tivoli Workload Scheduler by matching and routing workloads to best available resources in an on demand manner. Dynamic brokering is based on critical workload and critical path analysis, load requirements, IT resource availability and business policies.

IBM Tivoli Workload Scheduler LoadLeveler® delivers the ideal solution for high-performance computing environments such as financial modeling, research or biotechnology simulations. It can be integrated with Tivoli Workload Scheduler networks through IBM Tivoli Workload Scheduler for Virtualized Data Centers to allow enterprises to consolidate high-performance computing workloads with the service execution process.

For additional capabilities, the Tivoli workload automation portfolio can be easily integrated with these other IBM products:

- **IBM Tivoli Enterprise Portal,** a Web-based operations console, provides a high-level overview of the entire IT environment.
- **IBM Tivoli System Automation for z/OS,** proactively manages automation, high availability and performance for z/OS environments.
- **IBM Tivoli System Automation for Multiplatforms,** provides high availability for business applications running in open environments.
- **IBM Tivoli Business Systems Manager,** provides executive dashboards with knowledge of key business processes and real-time service level status from a single console.
- **IBM Tivoli Service Level Advisor,** delivers automated support for SLAs.
- I**BM Tivoli Provisioning Manager,** efficiently provisions and configures servers, operating systems, middleware, applications and network devices.
- **IBM Tivoli Storage Manager,** automates data backup and restore functions, supporting a broad range of platforms and storage devices, and centralizing storage management operations.
- **IBM Workload Manager for z/OS**, a component of the IBM z/OS operating system, can identify work requests based on service class definitions, sets performance goals for service classes and assigns specific IT resource usage constraints to service classes.

- **IBM Enterprise Workload Manager,** a management product for distributed, open systems, can identify work requests based on service class definitions, tracks performance of work requests and shifts computing resources as needed to achieve specified performance goals.
- **IBM Service Management** products, services and solutions automate and manage critical IT processes and enable IT governance.

Summary

Service execution continues to grow in importance and complexity. Traditional job management tools designed for static, siloed environments are now being replaced by workload automation solutions that support real-time management of the service execution process across the enterprise. As in many other areas of business technology, the current trend in workload management is toward greater integration, automation, flexibility and management visibility.

IBM Tivoli workload automation products can help organizations establish a single point of control to automate and manage simultaneous workloads across heterogeneous environments. Dynamic, end-to-end workload automation solutions can be developed to support standardized service execution processes as well as an SOA. The results can include improved resource utilization, reduced IT management costs and increased productivity throughout the enterprise.

For more information

To learn more about IBM solutions for dynamic, end-to-end workload automation, contact your IBM representative or IBM Business Partner, or visit **ibm.com**/tivoli

About Tivoli software from IBM

Tivoli software provides a comprehensive set of offerings and capabilities in support of IBM Service Management, a scalable, modular approach used to deliver more efficient and effective services to your business. Meeting the needs of any size business, Tivoli software enables you to deliver service excellence in support of your business objectives through integration and automation of processes, workflows and tasks. The security-rich, open standards–based Tivoli service management platform is complemented by proactive operational management solutions that provide end-to-end visibility and control. It is also backed by world-class IBM Services, IBM Support and an active ecosystem of IBM Business Partners. Tivoli customers and partners can also leverage each other's best practices by participating in independently run IBM Tivoli User Groups around the world — visit www.tivoli-ug.org

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