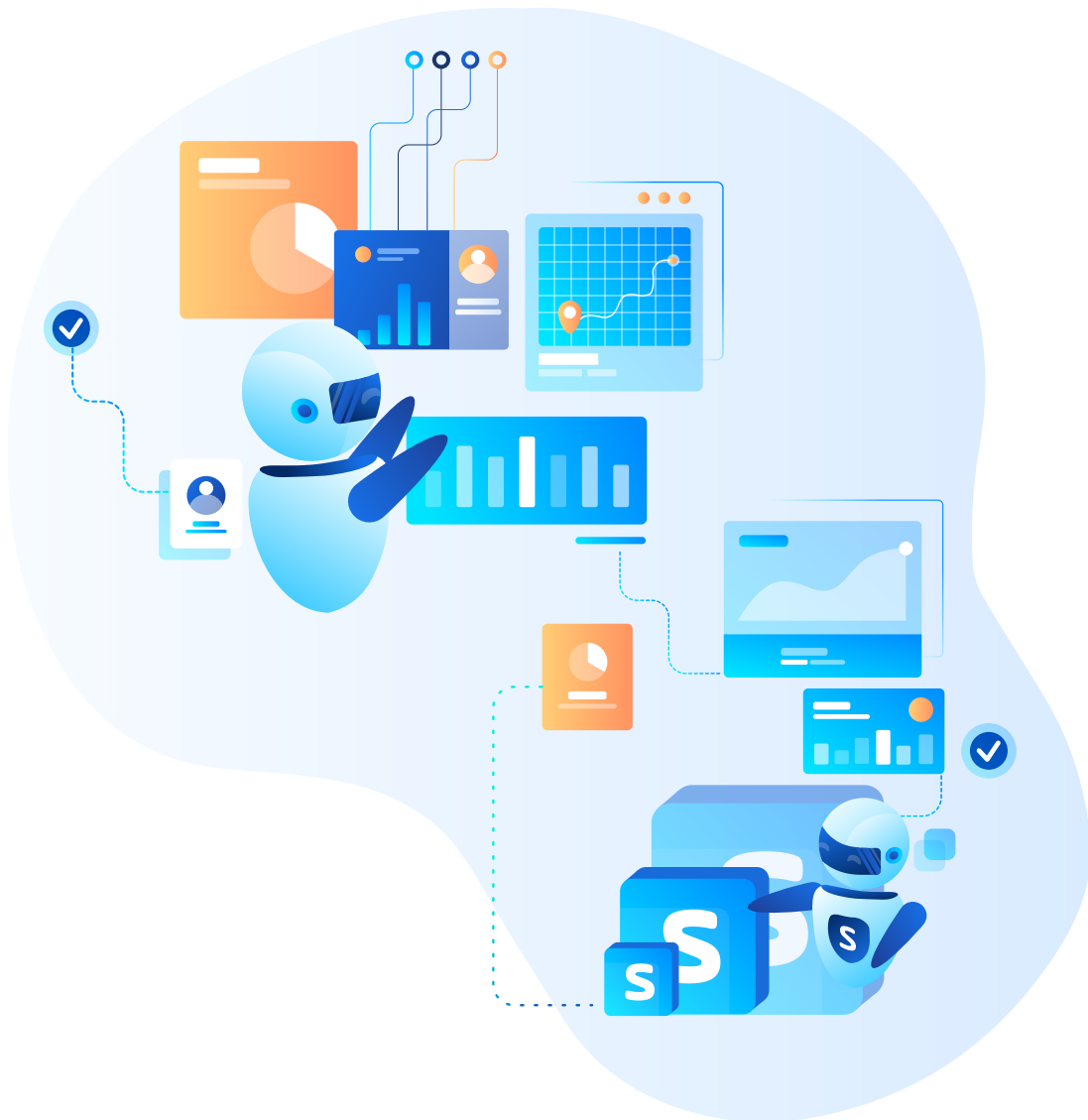# Go Beyond Traditional SAP Job Scheduling with Universal Automation Center

Overview

Enterprises rely on SAP to manage their entire suite of business processes, including finance, manufacturing, HR and many others. These processes often involve multiple applications and data sources—both SAP and non-SAP—residing on Windows-based or Unix/Linux servers, in the cloud or even on mainframes. Oftentimes, data needs to be transferred securely between enterprise headquarters and remote locations or business partners. Achieving end-to-end visibility, accessibility and observability requires integrating SAP with enterprise workload automation solutions.

Native SAP schedulers such as BPA, CPS, SM36/37—some of which are at their end-of-life—require SAP consultants to log into the SAP GUI. They also lack event-based scheduling capabilities and focus mainly on SAP-related jobs, such as running an ABAP report. The workflow capabilities for more complex SAP processes are also very limited and hard to maintain if, for example, an ABAP step fails. To enhance efficiency and free IT resources to work on more strategic tasks, a truly exceptional job scheduler should go beyond routine processes and offer real-time and event-based processing across all SAP and non-SAP jobs—whether on-prem and in the cloud—across the entire hybrid IT environment.

The Stonebranch Universal Automation Center (UAC) is an alternative to legacy SAP job scheduling approaches. As a full-featured workload automation solution, UAC helps manage and monitor SAP jobs and third-party application jobs from a single solution. The solution works across a hybrid IT environment that manages jobs and workflows across on-prem, cloud and containers (Figure 1). In addition, UAC offers the ability to manage automation for all job processes, file transfers and process chains from a centralized, fully audit-proven web GUI that offers a single-pane-of-glass view of all IT processes, end-to-end, via dashboards equipped with alerting and auditing capabilities.

Figure 1. SAP workflow example, containing SAP and non-SAP jobs
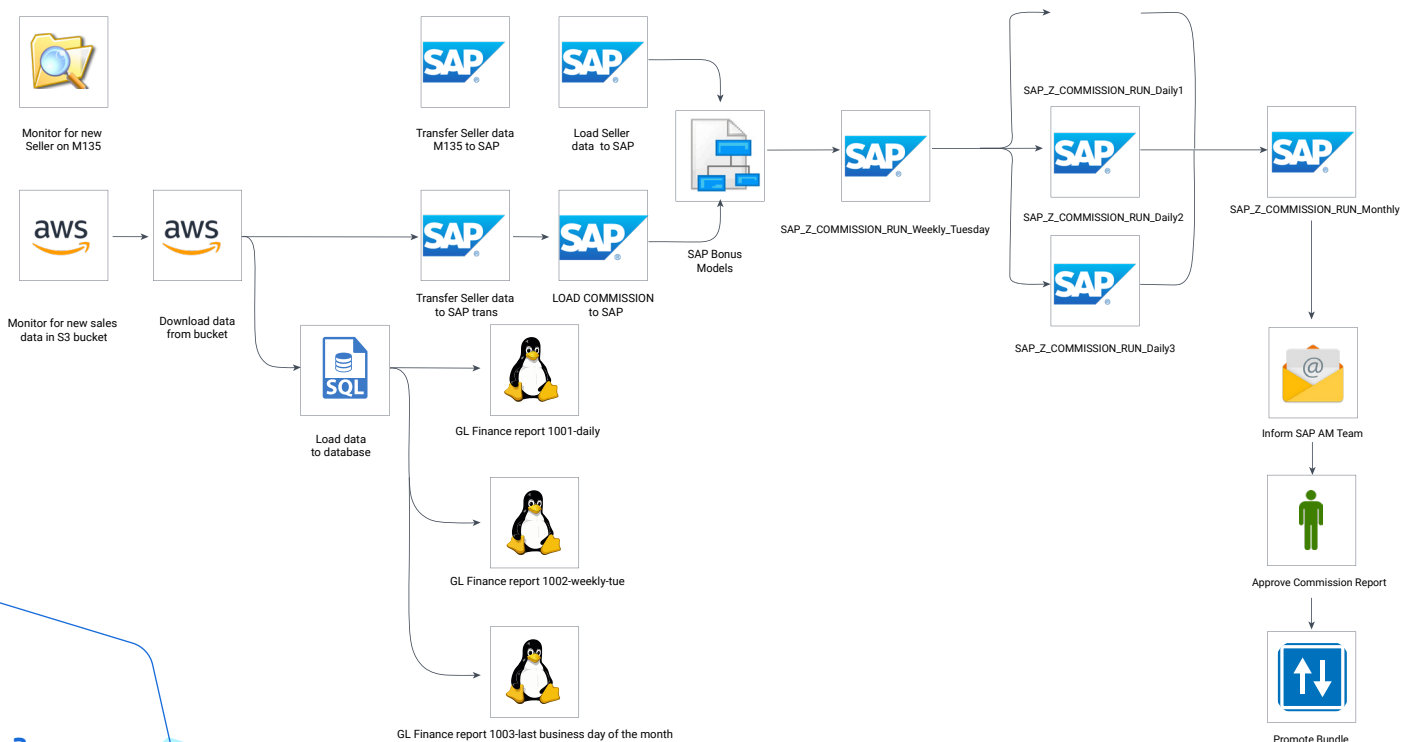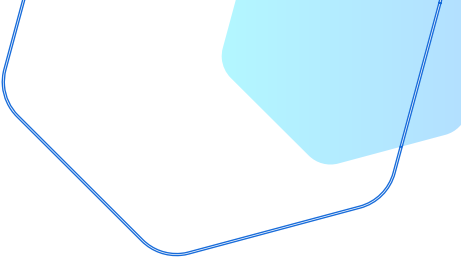
Why Use an Enterprise Job Scheduler?

Many leading businesses, including the ones shown below, use enterprise schedulers with SAP to reduce administrative and infrastructure provisioning costs, improve error handling, orchestrate tasks across multiple IT environments and ensure compliance through process control and centralization.

BMW Leading Car Manufacturer	**coop** Retailer With About 1,200 Shops	**Rabobank** Dutch Bank
bp Energy Company >1M SAP Tasks	**VORWERK** Household Appliances Since 1883	**ABN·AMRO** Dutch Bank
KOCH Petroleum, Chemicals, Energy	**LENNOX** Manufacturer of Air Conditioners	**ITERGO** German Insurance

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10 Benefits of Scheduling Jobs with UAC

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1. Free Up time and Resources

- Eliminate the drawbacks of your native SAP SM36/37-based scheduler and free up valuable time for your SAP and operations teams so they can focus on more valuable tasks by using a single, self-service-enabled web GUI to set up and control your entire SAP process, including both SAP and non-SAP tasks.

- Improve error handling by gaining full control of the entire SAP process; automatically react to incidents before they become critical.

2. Faster Processing

- Orchestrate and automate every step of each business process as it runs across SAP and non-SAP systems, resulting in overall faster processing.

- Optimize parallel execution of SAP ABAP code to accelerate processing by: 1.) controlling the number of parallel processes executed using virtual resources; and 2.) fully leveraging the existing SAP load-balancing cluster.

3. Security

Universal Automation Center uses the latest security standards, including:

- PKI infrastructure using X.509 certificates to perform peer authentication.
- TLS 1.2 encryption for all communication data and control channels.
- Multi-tenant role-based security concept supporting SAML, LDAP and Active Directory.
- Individual security credentials for each SAP job in a workflow—all centrally managed.
- Secure connection to SAP Secure Network Communications (SNC) via native SAP and third-party security modules like CyberSafe.
- The efficacy of the solution's security is regularly verified by external security companies.

4. Auditability

Fully automatic audit trails of the complete solution reveal the nature, time and source of each change.

- No more IT-audit violations or exceptions.
- Any change is available, including before and after images.
- Auditing supports compliance with Sarbanes-Oxley requirements.
- All audit reports are automatically archived.

5. Managed File Transfer Capabilities

Universal Automation Center comes equipped with managed file transfer capabilities to move your sensitive SAP input data between your SAP application server and any other platform—even a mainframe—in a secure, fast and reliable way.

Here are some of the highlights of the built-in managed file transfer solution:

- Any-to-any/platform-independent transfer to and from z/OS, i5 (AS/400), Unix, Linux, Windows, and the cloud (AWS, Azure, Google).
- An extensive script language for data transfer and a central script library for storing scripts.
- Integrates into your existing scheduler landscape.
- Part of the Universal Automation Center—a file transfer is a task like any other.
- Restart functionality, automatic failover.
- Authentication, encryption and compression that support highest security standards developed for many banking and healthcare customers.

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6. Centralized Real-Time Control

The Universal Automation Center dashboard provides a real-time view of all SAP and non-SAP jobs. The drill-down functionality allows job analysis up to the level of system log files (for example, an SAP job log), even while the ABAP script is executing in SAP.

- UAC's real-time dashboard allows a centralized setup, control and monitoring of all business processes using a fully customizable web GUI.
- Model your SAP process to consist of SAP, non-SAP and file-transfer tasks in a single workflow.
- Self-service-enabled configuration and operation—no SAP GUI login required.

7. Cloud-Based SaaS Solution with Zero Installation Required

- Operate SAP scheduling from anywhere.
- Unify all services, users and processes into a single, easy-to-manage solution.
- High availability with geo redundancy.
- Secure: SAML, SAP SNC (e.g.,via CyberSafe, TLS 1.2)
- Easy-to-learn, intuitive UI enables IT Operations team to get up in running in no time while also becoming significantly less dependent on IT and SAP administrator.

8. Decreased Batch Processing Time

- Real-time resource control of event-based and time-based processes and tasks, including critical path handling.

9. Supports all SAP Business Areas

- SAP ERP
    - > ABAP jobs scheduling
    - > BW process chains
    - > SAP HCI, IBP
    - > SAP system copies
    - > SAP transport management
    - > Upload data to SAP (IDOC, BAPI, ALE, LDAP)
- Data warehouse processes
    - > SAP Data Services—ETL
    - > SAP business objects—reporting
    - > QLIK, Informatica, etc.

10. SAP Certified

Powerful integration with multiple SAP systems that can be deployed in a high-availability, active-active configuration to remove risks from single points of failure and solution availability.

- Run SAP business objects and SAP data integration services
- Trigger any SAP ABAP job or a SAP business warehouse process chain based on an SAP or a third-party event such as an AWS SQS message
- Orchestrate across SAP Netweaver and SAP S/4 HANA processes simultaneously keeping ECC6.0 workflows in S/4 HANA
- Schedule SAP Fiori applications

SAP® Certified
Integration with SAP NetWeaver®

SAP® Certified
Integration with Applications on SAP HANA®

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Universal Automation Center Solution Description

Universal Automation Center is a modern, 100% web-based enterprise workload automation solution that allows end-to-end management of complex business processes. It includes a fully functional web-based GUI for both scheduling definition and administration. No thick client is needed.

When using our SaaS solution in the AWS cloud, no local installation is required.
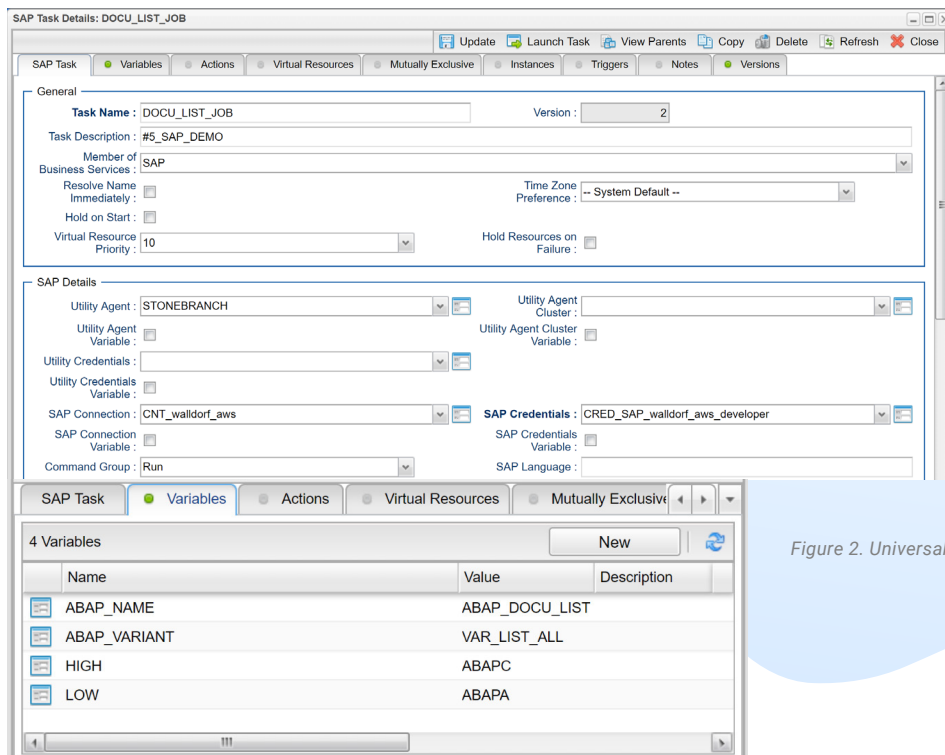
Within Universal Automation Center, there are SAP tasks that allow you to:

- Initiate workloads on SAP systems.
- Directly connect predecessor/successor relationships with non-SAP workloads.
- Gain accessibility, visibility and manageability of both SAP and other enterprise workload tasks, including file transfers.

The SAP task uses the proprietary SAP-certified Universal Connector for SAP ERP in order to communicate with SAP. The web user interface provides a simple fillable form that allows even novice users to define SAP workloads.

The following figures show an example of an SAP task that starts an ABAP with a VARIANT that retrieves the ABAP documentation items from ABAPA to ABAPC.

- SAP JOB NAME: DOCU_LIST_JOB
- ABAP: ABAP_DOCU_LIST
- VARIANT: VAR_LIST_ALL with Parameters: HIGH=ABAPC, LOW=ABAPA
- SAP System: CNT_walldorf_aws with SAP credentials: CRED_SAP_walldorf_aws_developer

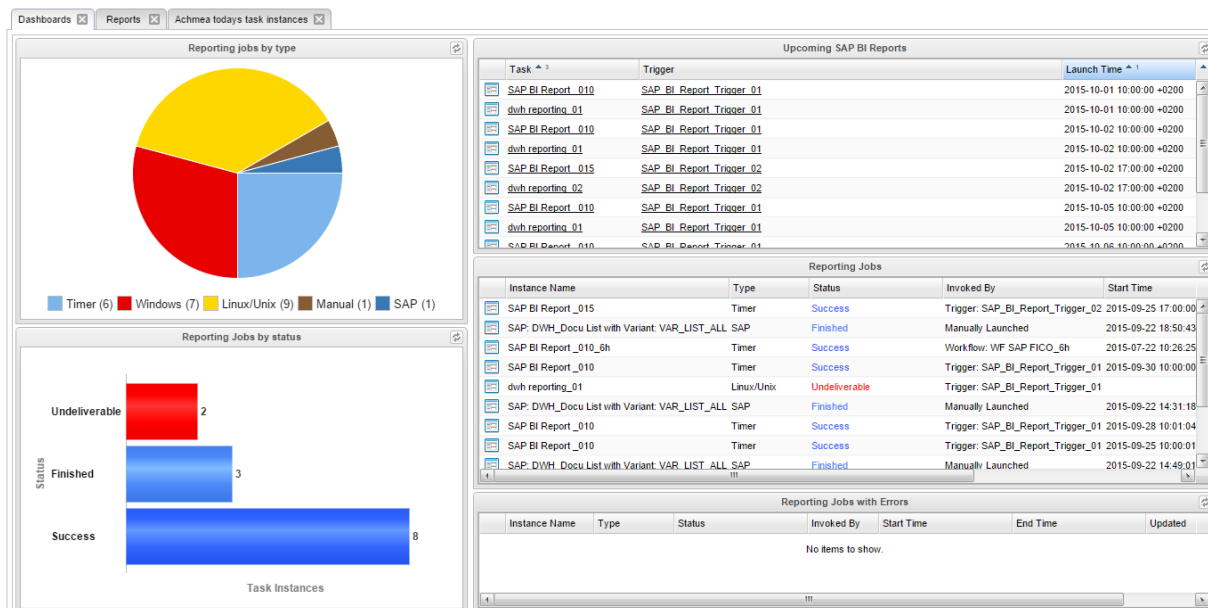Figure 2. Universal Automation Center, SAP task
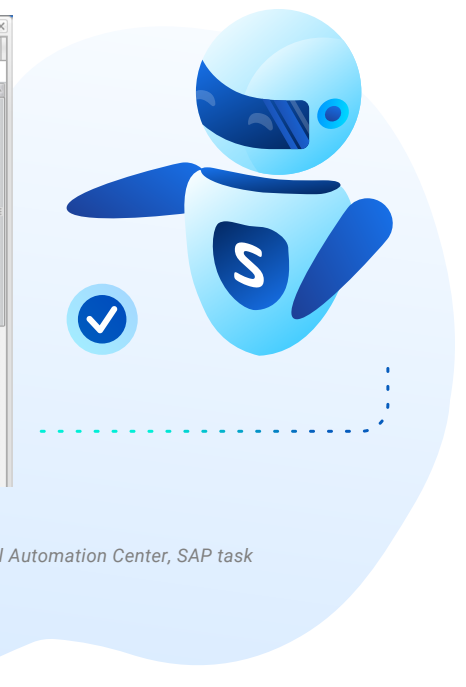
UAC Solution Overview

Perform All Scheduling-Related Tasks from the Cloud

Universal Automation Center is available as either an on-premises or high-availability cloud-based solution in AWS. All scheduling-related tasks, from the configuration of SAP and non-SAP jobs to daily operations and auditing, can be performed using a single Universal Controller web GUI. When using our cloud solution, UAC is immediately available. No agent is required on your local SAP system, as the connection to SAP is done in an agentless manner via SAP secure network. The cloud additionally supports the latest security standards, including SAML, SNC (via, for example, CyberSafe and TLS 1.2), and is used by some of world's largest enterprises.

Figure 3. Universal Automation Center dashboard

Create and Modify SAP Jobs

The Universal Automation Center web GUI allows you to define new SAP jobs or modify existing ones, either by using a job definition file or by copying an existing job, without any need to log into an SAP GUI.

You can also use your existing SAP calendar for scheduling and automatically sync them with UAC; alternatively, you can define your own calendar.

All jobs are under version and audit control, so you can always go back to an older version if required. Any changes made to a job definition are tracked in the audit log.

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Starting and Controlling SAP Jobs

Using the Universal Controller web GUI, you can start, query and delete SAP jobs and check the status of a running SAP job in real time. This includes querying of SAP job logs and spool lists. Automatic alarms can be configured to inform you (by e-mail or with your own monitoring system through SNMP trap) about any SAP or non-SAP job failure. Integration with tools such as ServiceNow, Zenoss or BMC Event Manager are also supported. Additionally, you can configure automatic actions, such as restarting a job automatically or applying a correction to a workflow before running it. Jobs can be monitored and controlled through the real-time dashboard or using the graphical real-time workflow monitor, as shown in the illustration below.

Figure 4. Universal Automation Center dashboard
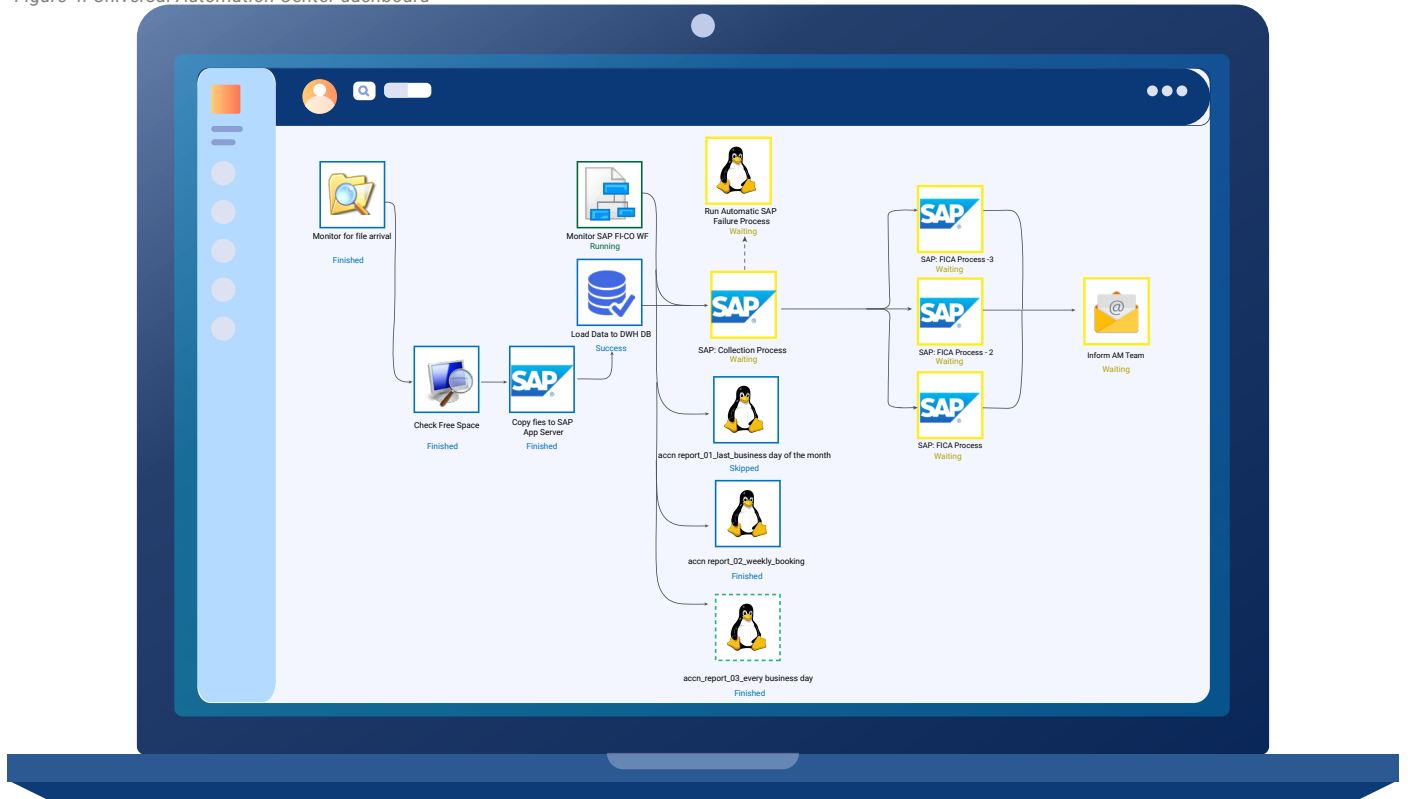
Importing Existing SAP Jobs

The Stonebranch Xpress Conversion Tool is a self-service tool that allows you to import and optimize all your existing SAP native scheduler-defined jobs, including SAP calendars, into Universal Automation Center. Once imported, all jobs can be run directly from the Universal Automation Center.

Note: If you are already using an enterprise scheduler, the Xpress Conversion Tool also has conversion modules for all major schedulers on the market.

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Client Fault Tolerance

If the Universal Connector for SAP terminates unexpectedly while processing an SAP job, the client fault tolerance restart capability allows Universal Connector to reconnect to a running (or completed) SAP job without losing track of work in progress (or already completed) on the SAP system. In addition, it prevents the unintended restart of the original SAP jobs.

Automatic SAP System Log Retrieval for Failed Jobs

When an SAP command fails, the Universal Connector for SAP will retrieve an excerpt of the SAP system log covering the period during which the failure occurred. This makes it easier to diagnose any problems without having to reach out to the SAP team or log in to the SAP GUI. The automatic log retrieval can also be turned off if it is not needed.

Parent/Child Functionality

Parent/child relationships between jobs are identified and monitored. Monitoring a submitted job can now be configured to take into account the activity of all child jobs. In addition, you can control the printing of job logs and spool lists, as well as the purging of child jobs.

SAP Events

This feature allows you to trigger a specified SAP background-processing event and to query the SAP system's event history. The SAP event monitor Universal Task allows you to monitor and confirm the occurrence of a specific SAP event. If an event is identified, an SAP or non-SAP task can then be automatically launched.

Variant Management

SAP variants can be created and modified in Universal Automation Center using a variant definition file. There is no need to create the required variants in SAP before running an ABAP script. It is also possible to retrieve existing variants defined for a specific job in SAP. When starting an SAP task from Universal Controller, the variant parameters can be dynamically set using Universal Controller variables.

Process/Monitor Batch Input Sessions

With Universal Automation Center you can process and monitor batch input sessions. Any errors are immediately shown in the real-time dashboard (an e-mail or SNMP notification can also be sent automatically). Further actions, such as restart after correction, can be taken directly from the web GUI.
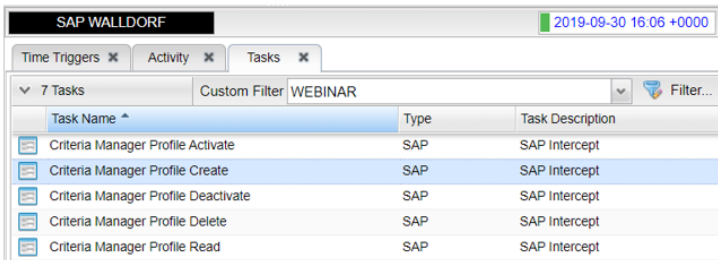
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Job Interception

Universal Automation Center also supports both XBP 2.0 and XBP 3.0 styles of job interception.

For XBP 2.0, UAC provides the ability to create, modify, display and delete the job interception table.

For XBP 3.0, UAC can use the criteria manager for job interception functionality (this is the same criteria manager that is used to set SAP criteria for event history and raised event). Jobs that have been intercepted (XBP 2.0 or XBP 3.0) can also be displayed.
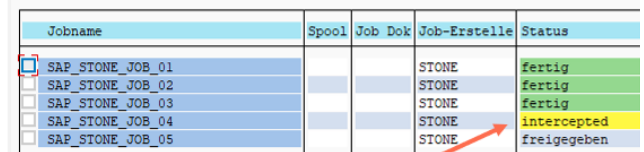
- To automatically identify and launch intercepted jobs, all you need to do is enable the "SAP Intercept Monitor Trigger" trigger.
- In addition, Universal Automation Center allows you to create, activate, deactivate, list and delete criteria profiles via a Universal Controller SAP task

Figure 5. Identify and launch automatically intercepted jobs from Universal Controller

The Task *SAP_STONE_JOB_04* will be automatically launched from Universal Controller.

SAP Business Warehouse Features

Universal Connector for SAP is also certified to manage process chains and info packages.

- Process chain execution and monitoring
- Restart failed process chains
- Interrupt process chains
- Display list of process chains matching specified criteria
- Display list of info packages matching specified criteria
- Run and monitor info packages
- Many additional supported functions

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Schedule SAP Business Objects and SAP Data Services Jobs

The Universal Task for SAP business objects allows web-service-based scheduling of business objects entities like Crystal reports and SAP Webi reports.

The Universal Task for SAP Data Services allows users to execute SAP Data Services ETL jobs. Both SAP BO and SAP DS jobs can be seamlessly integrated in an SAP business process containing SAP and non-SAP jobs, including file-transfer tasks.

Integrating with the SAP System and Third-Party Workload Automation Solutions

Integrating with the SAP system can be done via z/OS, Windows or Linux/Unix operating systems. As with other agent technology from Stonebranch, Universal Connector for SAP ERP can be integrated using ANY other vendor's workload automation solution (including but not limited to CA 7, CA AutoSys, UC4, Tivoli Workload Scheduler, BMC Control-M, ASG Zeke).

Automate Your SAP System Copies

The SAP System Copy solution from Libelle SystemCopy (LSC) has been integrated with Stonebranch Universal Automation Center. The solution thoroughly covers all aspects of SAP pre-processing (e.g., exports), complete database copy (e.g., snapshots or backup/ restore) and SAP post-processing (e.g., imports, BDLS, TemSe). The solution also fully supports SAP HANA-based systems.

The SAP system copy workflow can be operated by your existing scheduling team like any other SAP or non-SAP scheduling workflow. Operation of the automated SAP system copy workflow is done using the Universal Automation Center web GUI.

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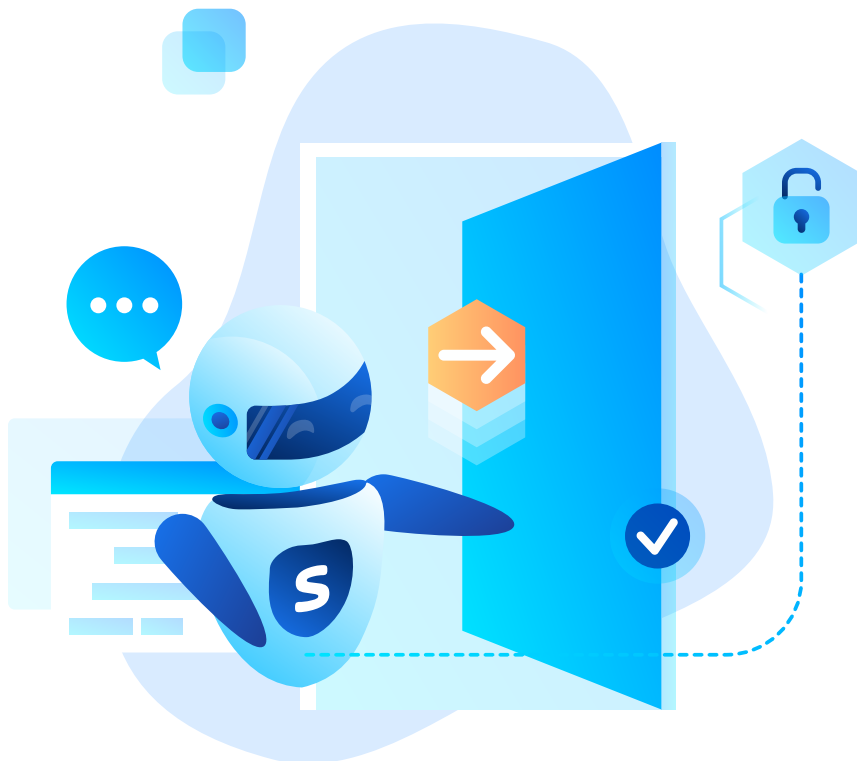
Solution Description

Universal Automation Center Architecture

Universal Automation Center's architecture is simple to implement and maintain, and it supports commodity hardware and infrastructure. Yet, UAC scales to support even the largest job scheduling environments. Our cutting-edge technology is built upon a highly portable architecture with built-in fault tolerance and failover capabilities. The Universal Controller itself runs in an Apache Tomcat web application container; therefore, it supports all operating systems with a Java runtime. It relies on a relational database. The Universal Agents are connected via a middleware message service called OMS, which provides fault-tolerant communication between the controller and agents.

Figure 6. Universal Automation Center architecture
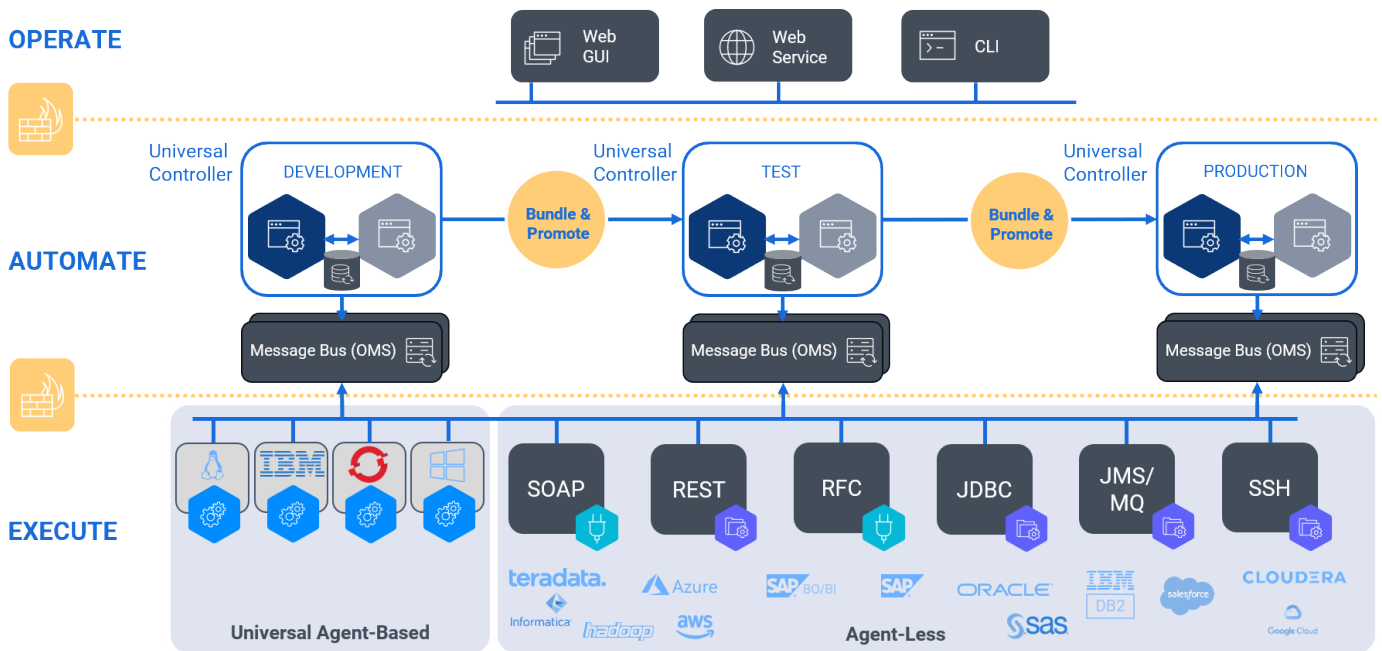
Description

From an architectural point of view, UAC's components fulfill the following roles:

Components

Universal Controller (UC)

- Web application with user and administration web GUI
- Business logic to control workflows and processes
- Persist UAC system state
- Exposes RESTful APIs and CLI for head-less operation
- Agent-less integration to orchestrate web services and DBs

Message Bus (OMS)

- Messaging middleware
- Inbound connections from clients

Universal Agent–Based Scheduling

- Executes and monitors workload
- Performs managed file transfer (MFT)
- Connects to Universal Controller via OMS
- Exposes CLI to execute workload from any scheduler
- Installed on wide variety of operating systems (MF, server, virtual server, container)
- Tight integration with SAP for full application automation

Agent-less Scheduling

- Applications providing an API are scheduled without using an agent using the provided protocol (SOAP, REST, etc.)
- Open-source marketplace with many pre-integrated application connectors available in GitHub
- Dedicated certified connector is provided for SAP and PeopleSoft

Bundle and Promote: Lifecycle Management

- Bundle and promote allows for the automatic moving of tested configurations from DEV -> TEST -> PROD. Supports any C:D DevOps scenario.

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Self-Service Dashboard

All scheduling-related tasks, including the configuration of SAP and non-SAP jobs and daily operations and auditing, can be performed using the single Universal Controller web GUI.

Depending on the user's role (admin, operations team member, reporting/auditing, etc.), the web GUI can be assigned by functionality and tailored in terms of visibility and permissions. Moreover, the provided real-time dashboard contains many free and configurable real-time widgets showing the information required for each user profile. The dashboard screenshot below displays several widgets with functions such as:

- Forecasting data, showing jobs running in the future
- Predictive analysis data, including critical path calculation, average run time and estimated end time
- Manual task (manual approval steps)
- System status
- Task with error

Figure 7. Self-service dashboard in Universal Controller
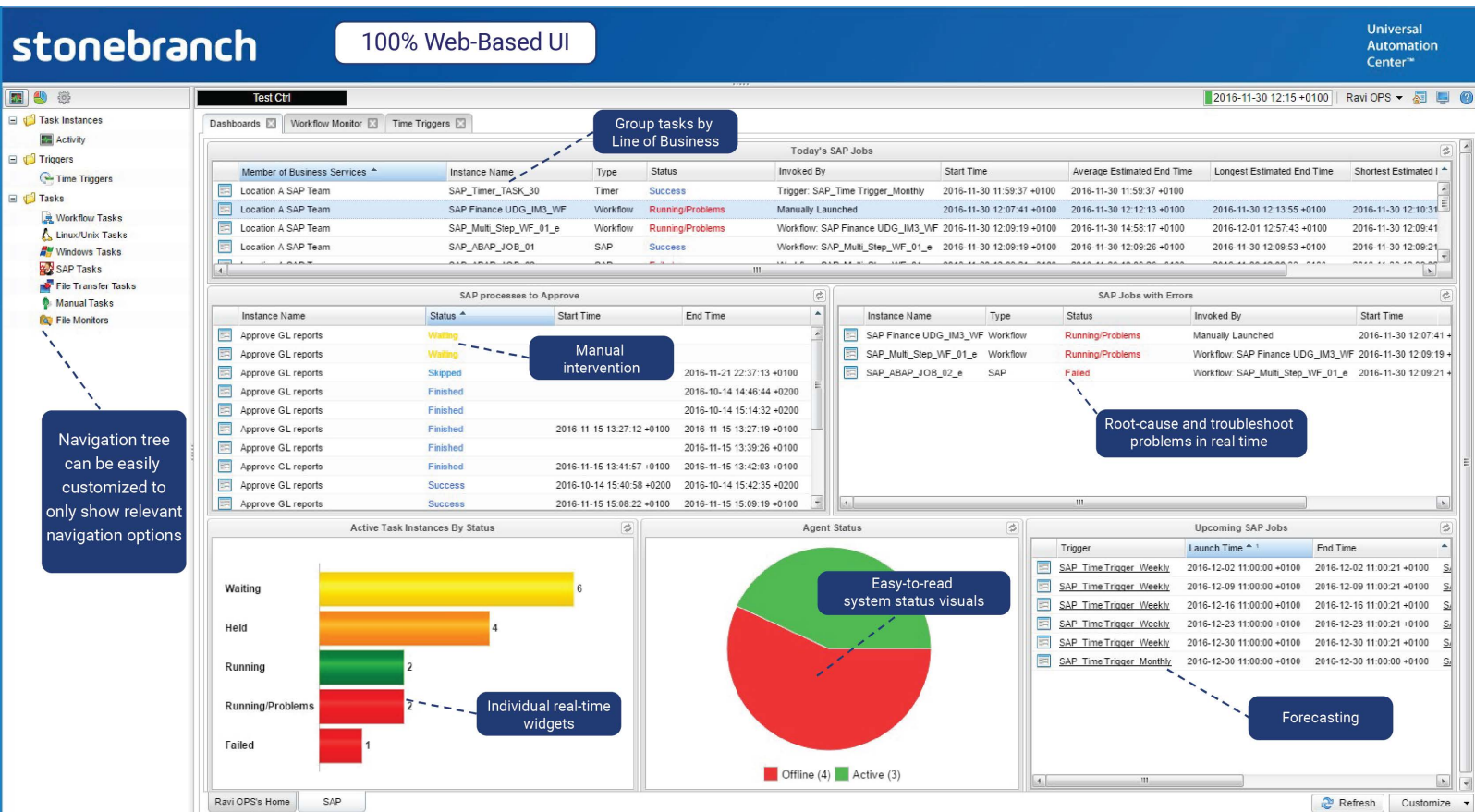
Secure Connection to SAP

One of this solution's key benefits is that you can configure and run your SAP jobs from the Universal Controller while it is deployed as a SaaS solution in an AWS VPC. Using this approach allows users to perform job scheduling independent of location. In such a scenario it is very important that the SAP RFC connection with the SAP system is highly secured.

The following security features ensure a secured connection:

- User authentication via SAML
- All communication is encrypted using TLS 1.2
- Certificates to perform peer authentication between the SAP connector agent and the Universal Automation Center middleware OMS
- RFC connection secured via SAP SNC using third-party CyberSafe or native SAP encryption modules
- Only outbound connection from the SAP connector agent toward the Universal Automation Center middleware OMS in the cloud

Figure 8. Connection of an on-premises SAP system to the Stonebranch cloud controller

SAP Performance

Universal Automation Center's latest performance benchmarks on Dell PowerEdge servers from the Dell Performance Center in Walldorf delivered outstanding cost/performance ratio results, demonstrating Stonebranch's ability to deliver the high-performance solutions required to tackle the business challenges of today's and tomorrow's market.

Key results of benchmark tests:

- 7.9 million SAP function module calls per day with a single OMS server
- 4.6 million ABAP jobs (read and write) per day
- The SAP HANA-based system remained stable, with 0% performance degradation
- System is horizontally scalable by adding additional OMS servers
- 9.4 million Linux tasks per day using a single OMS server
- 15.9 million Linux tasks per day using two OMS servers on a shared SSD
- 23.0 million Linux tasks per day using three OMS servers on a shared SSD
- Universal Automation Center improved its performance by a factor of 7.0

For a detailed report on the performance test contact us directly: https://www.stonebranch.com/contact

Transition of Existing SM36 Defined Jobs

Stonebranch's Xpress Conversion Tool (XCT) transitions all your existing SAP job definitions made through SM36 into Universal Automation Center. This also includes SAP calendar.

Our XCT reads the existing SAP job definitions from the selected SAP system and converts them into Universal Controller SAP tasks, workflows and triggers. Multi-step ABAP jobs can be automatically transitioned toward Universal Controller workflows, allowing users to restart a failed ABAP step at any point in the workflow.

Figure 9. SAP Xpress Conversion Tool (XCT)
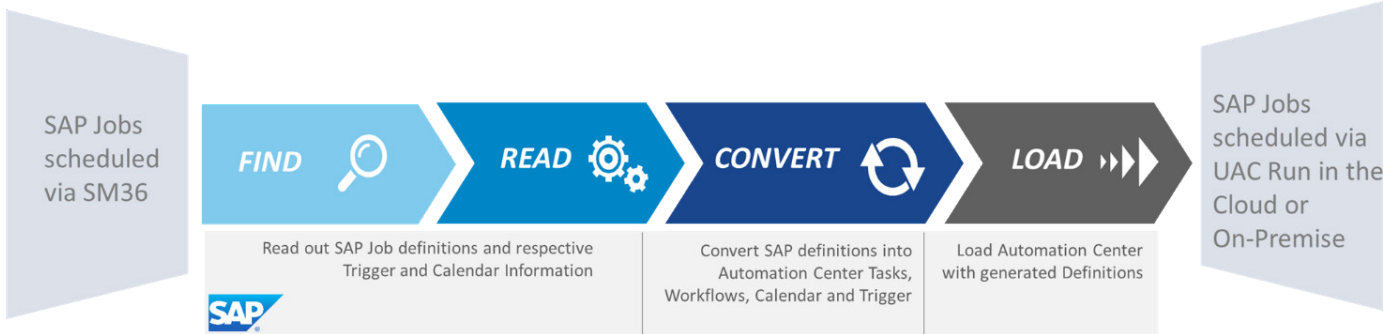
Figure 10. SAP Xpress Conversion results

Why Universal Automation Center for SAP Scheduling

Conversion Result Summary

- After the conversion process, all jobs in scope can be scheduled via Universal Automation Center
- Multi-step ABAP jobs are converted automatically into Universal Automation Center workflows (optional)
- Highly optimized error handling (e.g., restart at any point in the workflow, including restarts at any ABAP step)
- 100% web-based scheduling of all transitioned SAP jobs: No SAP GUI login required
- Workload lifecycle management (DEV->Test->PROD)
- Audit log of all SAP task executions
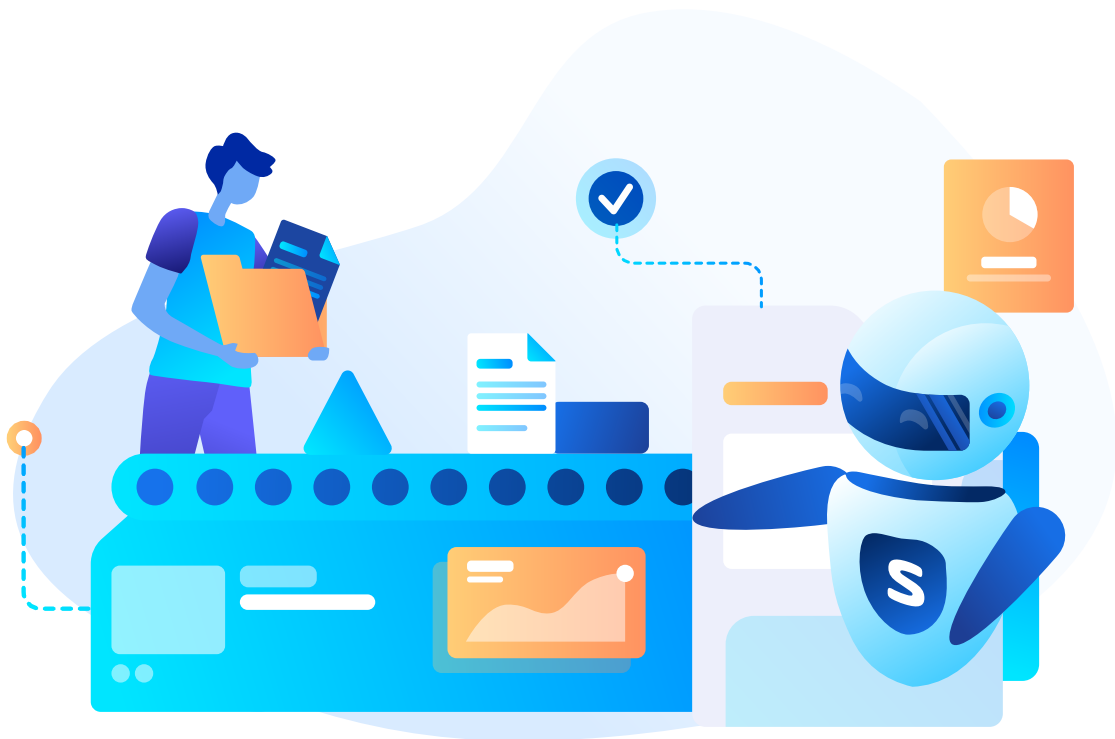
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About Stonebranch

Stonebranch builds IT orchestration and automation solutions that transform business IT environments from simple IT task automation into sophisticated, real-time business service automation, helping organizations achieve the highest possible Return on Automation.

No matter the degree of automation, Stonebranch platform is simple, modern, and secure. Using the Stonebranch Universal Automation Platform, enterprises can seamlessly orchestrate workloads and data across technology ecosystems and silos.

Headquartered in Atlanta, Georgia, with points of contact and support throughout the Americas, Europe, and Asia, Stonebranch serves some of the world's largest financial, manufacturing, healthcare, travel, transportation, energy, and technology institutions.

www.stonebranch.com

UAC works in hybrid IT environments across multiple platforms and business applications in real time. Available on-premises or as a SaaS-based deployment, the UAC is a modern platform built to scale with your business.

To learn more about how an automation platform can drive your business forward, contact us today.

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