



SOFTWARE AG CLOUD

webMethods Cloud System

System and Organization Controls (SOC) for Service Organizations Report
for the period of April 1, 2021 to September 30, 2021



Report of Independent Service Auditors issued by Aprio LLP

Table of Contents

- I. Report of Independent Service Auditor 1**
- II. Software AG Cloud’s Assertion 3**
- III. Software AG Cloud’s Description of the Boundaries of its System 4**
 - A. Scope and Purpose of the Report..... 4
 - B. Company Overview and Background..... 4
 - C. System Overview 4
 - D. Principal Service Commitments and System Requirements 50
 - E. Non-Applicable Trust Services Criteria..... 50
 - F. Subservice Organizations 51
 - G. User Entity Controls 53

I. Report of Independent Service Auditor

We have examined Software AG Cloud's (the "Company" or "Software AG") accompanying assertion titled *Software AG Cloud's Assertion* (the "Assertion") that the controls within the webMethods Cloud System (the "System") were effective throughout the period April 1, 2021 to September 30, 2021 (the "Specified Period") to provide reasonable assurance that Software AG Cloud's service commitments and system requirements were achieved based on the trust services criteria relevant to Security and Availability ("applicable trust services criteria") set forth in TSP section 100, *2017 Trust Services Criteria for Security, Availability, Processing Integrity, Confidentiality, and Privacy* (AICPA, *Trust Services Criteria*).

The Assertion notes that the Company uses Amazon Web Services (AWS) and Microsoft Azure, subservice organizations, for its third-party hosting of servers and equipment in an infrastructure-as-a-service environment, including the restriction of physical access to the defined system including, but not limited to, facilities, backup media, and other system components such as firewalls, routers, and servers. The description indicates that complementary subservice organization controls that are suitably designed and operating effectively are necessary, along with controls at the Company, to achieve the Company's service commitments and system requirements based on the applicable trust services criteria. The Assertion indicates that certain AICPA Applicable Trust Services Criteria specified in the section titled *Software AG Cloud's Description of the Boundaries of its System*, under the section *Subservice Organizations*, can be achieved only if complementary subservice organization controls assumed in the design of the Company's controls are suitably designed and operating effectively, along with related controls at the Company. Our examination did not extend to the controls of the subservice organizations, and we have not evaluated the suitability of the design or operating effectiveness of such complementary subservice organization controls.

The Assertion indicates that certain AICPA Applicable Trust Services Criteria specified in the section titled *Software AG Cloud's Description of the Boundaries of its System*, under the section *User Entity Controls*, can be achieved only if complementary user entity controls contemplated in the design of the Company's controls are suitably designed and operating effectively, along with related controls at the Company. Our examination did not extend to such complementary user entity controls, and we have not evaluated the suitability of the design or operating effectiveness of such complementary user entity controls.]

Service Organization's responsibilities

The Company is responsible for its service commitments and system requirements and for designing, implementing, and operating effective controls within the system to provide reasonable assurance that the Company's service commitments and system requirements were achieved. The Company has provided the accompanying assertion titled *Software AG Cloud's Assertion* about the suitability of design and operating effectiveness of controls. When preparing its assertion, the Company is responsible for selecting, and identifying in its assertion, the Applicable Trust Services Criteria and for having a reasonable basis for its assertion by performing an assessment of the effectiveness of the controls within the system.

Service Auditor's responsibilities

Our responsibility is to express an opinion, based on our examination, on whether management's assertion that the controls within the system were effective throughout the period to provide reasonable assurance that the service organization's service commitments and system requirements were achieved based on the Applicable Trust Services Criteria. Our examination was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants. Those standards require that we plan and perform our examination to obtain reasonable assurance about whether management's assertion is fairly stated, in all material respects. We believe that the evidence we obtained is sufficient and appropriate to provide a reasonable basis for our opinion.

Our examination included:

- Obtaining an understanding of the system and the service organization's service commitments and system requirements;
- Assessing the risks that the controls were not effective to achieve the Company's service commitments and system requirements based on the Applicable Trust Services criteria; and
- Performing procedures to obtain evidence about whether controls within the system were effective to achieve the Company's service commitments and system requirements based on the Applicable Trust Services Criteria.

Our examination also included performing such other procedures as we considered necessary in the circumstances.

Inherent limitations

There are inherent limitations in the effectiveness of any system of internal control, including the possibility of human error and the circumvention of controls.

Because of their nature, controls may not always operate effectively to provide reasonable assurance that the service organization's service commitments and system requirements were achieved based on the Applicable Trust Services Criteria. Also, the projection to the future of any conclusions about the effectiveness of controls is subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

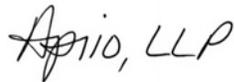
Other matter

We did not perform any procedures regarding the operating effectiveness of controls stated in the section titled *Software AG Cloud's Description of the Boundaries of its System*, and, accordingly, do not express an opinion thereon.

Opinion

In our opinion, Software AG Cloud's assertion that the controls within the Company's System were effective throughout the Specified Period to provide reasonable assurance that the Company's service commitments and system requirements were achieved based on the Applicable Trust Services Criteria, in all material respects, is fairly stated.

Aprio, LLP



Atlanta, Georgia
November 10, 2021



II. Software AG Cloud's Assertion

We are responsible for designing, implementing, operating, and maintaining effective controls over Software AG Cloud's (the "Company" or "Software AG") webMethods Cloud System (the "System") throughout the period April 1, 2021 to September 30, 2021 (the "Specified Period"), to provide reasonable assurance that the Company's service commitments and system requirements relevant to Security and Availability were achieved. We have performed an evaluation of the effectiveness of the controls within the system throughout the Specified Period to provide reasonable assurance that the Company's service commitments and system requirements were achieved based on the trust services criteria relevant to Security and Availability (the "Applicable Trust Services Criteria") set forth in TSP section 100, *2017 Trust Services Criteria for Security, Availability, Processing Integrity, Confidentiality, and Privacy* (AICPA, *Trust Services Criteria*). The Company's objectives for the system in applying the Applicable Trust Services Criteria are embodied in its service commitments and system requirements relevant to the Applicable Trust Services Criteria. The principal service commitments and system requirements related to the Applicable Trust Services Criteria are specified in the section titled *Software AG Cloud's Description of the Boundaries of its System*.

Software AG Cloud uses Amazon Web Services (AWS) and Microsoft Azure, subservice organizations, for its third-party hosting of servers and equipment in an infrastructure-as-a-service environment, including the restriction of physical access to the defined system including, but not limited to, facilities, backup media, and other system components such as firewalls, routers, and servers. Certain AICPA Applicable Trust Services Criteria specified in the section titled *Software AG Cloud's Description of the Boundaries of its System*, under the section *Subservice Organizations*, can be achieved only if complementary subservice organization controls assumed in the design of the Company's controls are suitably designed and operating effectively, along with related controls at the Company. Management's assertion includes only the controls of the Company and excludes the controls performed by the subservice organizations.

Certain AICPA Applicable Trust Services Criteria, specified in Section III, *Software AG Cloud's Description of the Boundaries of its System*, under the section *User Entity Controls* can be achieved only if complementary user entity controls contemplated in the design of the Company's controls are suitably designed and operating effectively, along with related controls at the Company. Management's assertion includes only the controls of the Company and excludes the controls performed by User Entities.

There are inherent limitations in any system of internal control, including the possibility of human error and the circumvention of controls. Because of these inherent limitations, a service organization may achieve reasonable, but not absolute, assurance that its service commitments and system requirements are achieved.

We assert that the controls within the System were effective throughout the Specified Period to provide reasonable assurance that the Company's service commitments and system requirements were achieved based on the Applicable Trust Services Criteria.

III. Software AG Cloud’s Description of the Boundaries of its System

A. Scope and Purpose of the Report

This report describes the control structure of Software AG Cloud (the “Company” or “Software AG”) as it relates to webMethods Cloud System (the “System”) for the period of April 1, 2021 to September 30, 2021 (the “Specified Period”) for the trust services criteria relevant to Security and Availability (the “Applicable Trust Services Criteria”) as set forth in TSP section 100, *2017 Trust Services Criteria for Security, Availability, Processing Integrity, Confidentiality, and Privacy* (AICPA, *Trust Services Criteria*).

It is the responsibility of each specified party to evaluate this information in relation to the control structure in place at the user organization to assess the total internal control environment. The internal control structures at the Company are not designed to compensate for any weaknesses that may exist if the internal control structure at a user organization is ineffective.

B. Company Overview and Background

Company Overview

Software AG Cloud, an independent software company, enables enterprises to connect any technology—clouds, apps, devices and data—anywhere and any way they choose. More than Software-as-a-Service, we’re “Freedom as a Service,” enabling faster innovation in an increasingly connected world. Trusted by top brands for 50 years, the Company never stops pioneering the future of data. More on the Company’s analyst-recognized software for the Internet of Things and self-service analytics, integration and APIs, and business transformation can be found at softwareag.com.

C. System Overview

Software AG Cloud is an open and independent cloud platform. Its secure and reliable Platform-as-a-Service (PaaS) portal provides access to an ever-expanding set of integrated cloud services. This platform supports a wide range of uses cases and is ideal for accelerating its customers digital transformation, social and mobile collaboration—and infusing their cloud projects with innovation.

1. Infrastructure-as-a-Service (IaaS) Provider Infrastructure

Key IaaS provider infrastructure service components and monitoring services supporting the delivery of Cloud services are described in Parts 9 and 10 of this section of the report.

2. Software

Security and Monitoring Software

Key components supporting the delivery of cloud services include:

- *IaaS Provider*: The IaaS Provider(s) provides security and monitoring services as outlined in Parts 9 and 10 of this section of the report.
- *Trend Micro “Deep Security”*: Deep Security is an Infrastructure Protection tool that provides Intrusion Detection and Prevention, virus scanning, and vulnerabilities scanning for the customer’s environment.

See <http://www.trendmicro.com/aws/>

- *CrowdStrike*: CrowdStrike provides cloud workload and endpoint security, threat intelligence, and cyberattack response services.
See <https://www.crowdstrike.com/>
- *DivvyCloud*: DivvyCloud monitors and assesses cloud and container environments for security misconfigurations, infrastructure weaknesses, and policy compliance violations.
See <https://divvycloud.com/>
- *Splunk*: Splunk Enterprise helps enable the ability to search, monitor, and analyze machine data to gain valuable security monitoring intelligence and insights.
See http://www.splunk.com/en_us/products/splunk-enterprise.html
- *Duo Security*: Duo's Trusted Access platform secures the Company by verifying the identity of its users and the health of their devices before they connect to the Company's applications.
See <https://duo.com/>
- *Okta*: Okta is one trusted platform to secure every identity, from customers to the Company's workforce, with Single Sign-On, Multi-factor Authentication, Lifecycle Management, and more.
See <https://www.okta.com/>
- *JumpCloud*: JumpCloud[®] is a central source of authentication, authorization, and management of employees and their devices and the IT applications they access.
See <https://jumpcloud.com>
- *Akamai*: Akamai provides Enterprise access management (EAA).
See <https://www.akamai.com>
- *KeePassXC*: KeePassXC is a free open-source password manager which helps in managing passwords in a secure way. All passwords are kept in one database which is locked with one master key or a key file. The database is encrypted.

Management Software

The following services components are provided to facilitate the delivery of Cloud services

- *Confluence (iWiki)*: Confluence is a team collaboration software which is used by Cloud Service Operations to create and manage operational documentation (iWiki).
See <https://www.atlassian.com/software/confluence>
- *Jira (iTrac)*: iTrac is the Cloud Service Operations (CloudOps) and RnD bug fix and change management ticketing system. Customer incidents can be escalated to iTrac from Pivotal by the Global Support team or directly entered as incidents are identified.
See <https://www.atlassian.com/software/jira>

3. People

Cloud Service Unit Information security roles and responsibilities

Cloud Security, Compliance and Certification

- Cloud Security, Compliance and Certification (CSCC) is a centralized unit which is responsible to initiate and control the implementation and operation of information security within the Software AG Cloud Organization.
- Cloud Operations (CloudOps) is a function that defines all cloud operating functions of cloud family's business units and supportive cross-function cloud platform and cloud security and includes the following key roles which are described in further detail in the Cloud ISMS A6 Organization of Information security.

Head of BU Cloud Services

- Responsible for team management, coordination of service delivery, and compliance with cloud policies. This role conducts procedure reviews and participates in regular advisory sessions for change management and risk assessment.

Cloud Operations System Owners

- **Cloud Delivery:** Provides cloud product specific team leadership and is responsible for day-to-day management and coordination of running the service. This role is the ultimate point of escalation for product specific cloud operations issues.
- **Infrastructure:** Manages Cloud IaaS Infrastructure operational relationships for respective providers and provides common services applicable to all cloud systems.
- **Automation:** Delivers Infrastructure-as-code and provides cloud service specific baseline.
- **Security:** Responsible for security oversight across all CloudOps cloud services.

Cloud Operations Engineer

- The Cloud Operations Engineer is a supporting role for various cloud service operations tasks and the duties include but are not limited to:
 - Cloud Service Management
 - Cloud Service Administration

Members of CloudOps are located globally in Software AG offices in Germany, Bulgaria, USA, Australia, Malaysia and India. CloudOps is distributed in different time zones to provide “follow the sun” coverage for customer’s support needs and to offer maintenance windows outside of customer’s standard business hours.

Management and Board of Directors

The Supervisory Board collaborates with the Software AG Management Board to fulfill its advisory role as required by law and by the Company’s articles of incorporation. The Supervisory Board advises the Management Board in aspects of running the Company and supervises work performed by the Management Board. In doing so, the Supervisory Board is directly involved in all decision of key relevance to Software AG. The Management Board informs the Supervisory Board regularly, comprehensively, and promptly regarding all important aspects of strategy, the status of strategy implementation, planning, business development, the risk situation and risk management, and compliance via oral and written reports. The Management Board is also available to the Supervisory Board in meetings for questions and discussions where any deviations from planned business development is explained in detail.

External Suppliers

IaaS providers services are described in Parts 9 and 10 of this section of the report.

Internal suppliers

CloudOps interacts with several other Software AG teams to provide the Standard Cloud services.

- **Research and Development (RnD):** RnD develops and releases new product versions twice per year. They participate in regular Cloud change advisory board meetings to review change management and security topics. Product related customer incidents may be escalated to RnD through an iTrac ticket.
- **Global Support:** Global Support is the single point of contact for Cloud Customers. All support incidents are initially managed by a Global Support Customer Support Representative (CSR). If support cannot solve an incident directly, the incident is escalated to either CloudOps for cloud platform related issues, or to R&D for product related issues.
- **Product Management:** Product Management prioritizes new features for Software AG Cloud. They interface between RnD, CloudOps, Marketing and Sales for Cloud topics.

- *IT:* The team provides IT services to CloudOps such as Communication, Physical Asset Management and Networking for day-to-day business activities. They also administer basic access and use of Software AG Information systems.
- *Contract Management and Legal:* The CM&L Team is responsible for handover of a new contract to the CloudOps Team as a basis for delivering the service.

4. Data

Data Privacy and protection: Aligned with GDPR requirements and as documented in the Privacy Policy for Cloud & Managed Services the Software AG Data Privacy Office (dataprotection@softwareag.com) is the contact for customers and authorities regarding data privacy.

Customer Account Information: The customer is required to create an account to access and use the Services. To create an Account, the customer is required to provide certain personal information about the user and create a username and password. The customer is responsible for maintaining the confidentiality of its username and password and agrees to notify CloudOps if its password is lost, stolen, or disclosed to an unauthorized third party, or otherwise may have become compromised. The customer is responsible for all activities that occur under its Account.

Access to Tenant Data: Access control to the tenant application is in the responsibility of the customer. CloudOps personnel's access to tenant data requires customer consent. In the case of a support incident which requires access to the customer's Cloud Product tenant data, the customer can choose to grant access to the CloudOps to examine the issue by providing user credentials, function privileges and client license to access the data. All customer tenant data is directly encapsulated in the logically segregated tenant database.

IaaS Infrastructure: Customer tenant data is stored only inside the IaaS provider environment within the Cloud Product Service (at runtime) and the database and file storage (at rest). Processing of tenant data is directly encapsulated in the cloud application accessed via the cloud service.

Only CloudOps and other authorized Software AG support groups have access to the IaaS hosted environments with least privileges and with two-factor authentication. All access attempts and activities within the hosted environments are logged using CloudOps monitoring and IaaS provider services. Physical security is in the responsibility of the IaaS provider as outlined in Parts 9 and 10 of this section of the report.

5. Policies and Procedures

Standard procedures applicable to all standard cloud services are described in the section below. Procedures specific to a cloud service are described in the respective Cloud Services Specific Descriptions.

Customer Support: Standard Support for all cloud products include 24/7 access to the Customer web portal called Empower (<https://empower.softwareag.com>) where customers can search the Knowledge Center for articles, early warnings and technical whitepapers, access product documentation, and contact support through an eService interface. Within Empower, the customer can access all user guides, documentation, and application handbooks for the product, which are regularly updated with each release. Through the eService portal, customers can create incidents (support requests classified by crisis, critical or standard) and monitor the status of existing requests.

Contract Termination and Asset Removal: Upon expiry of the contract term, CloudOps will retain the latest state of the tenant including the latest tenant backup for 30 calendar days. CloudOps can provide Cloud customers with a backup of their customer data in the form of the last tenant backup in an encrypted file. This tenant backup can be restored in each Cloud product specific installation.

Software AG Cloud customers may request a list of all assets and document the schedule for the termination of service followed by the agreed time frame of their deletion. Assets of the Software AG Cloud customers that reside on the Software AG standard Cloud Service environments are removed and returned upon termination according to the Cloud Services Order Form terms. No copies of Software AG Cloud customer's information are retained on the Software AG premises except any that local legislation rules may require.

All customer assets are securely deleted according to IaaS provider standards as outlined in Parts 9 and 10 of this section of the report. CloudOps will also terminate the IaaS provider management account and virtual infrastructure components used to host the customer tenant data and temporary operational files for dedicated cloud services. The customer tenant data and operational temporary files are securely destroyed during standard tenant offloading for shared cloud services.

Procedures review: CloudOps Management and relevant team members regularly review all processes and procedures. A sample of recurring reviews are listed below.

- Organizational Structure - Including the assignment of roles and responsibilities and yearly review. Participants include the CloudOps team.
- Contract Changes – Quarterly review is conducted in the case of any amendments or service updates. Participants include the CloudOps team, CSCC, and Legal as necessary.
- Monitoring Process - Reviewed on a yearly basis by the CloudOps Management and the Monitoring experts.
- Escalation Process - Reviewed on a yearly basis by the CloudOps Management.
- Account Review - Periodic review with CloudOps and CSCC Management.

Control Environment: The Software AG Cloud Organization provides Software AG standard cloud services to its customers. The Software AG Cloud Organization leverages some aspects of Software AG's overall control environment in the delivery of these services. The collective control environment encompasses management and employee efforts to establish and maintain an environment which supports the effectiveness of specific controls.

Integrity and Ethical Values: Software AG's conformance with German Corporate Governance demonstrates that good corporate governance is a core component of management at Software AG. Software AG's Corporate Security Officer is responsible for awareness and complying with security policies, procedures, and standards. In addition, every Software AG employee is required to comply with the Company's Code of Business Conduct and Ethics. Software AG Cloud Management helps ensure that all Cloud Operations employees complete periodic security and compliance training.

Software AG Quality Management System: Software AG has implemented a quality management system (QMS) and is ISO 9001 certified for Global Support, Product Development & Management, and Global Consulting Services with GCS Sales and Managed Services - (worldwide) including supporting Services (IT Services, Human Resources, Facility Management and TA services). This certification is an independent validation of the Software AG quality system and verifies that Software AG activities comply with ISO 9001 requirements. Customers can reference the Software AG QMS certificate.

The Company's QMS is foundational for assuring high customer satisfaction, delivering the best-quality support services and software, as well as making continuous improvements. As part of the QMS, Product Development's and Global Support's system describes the processes, roles and rules that guide the daily work of every employee and how critical assets are secured.

This framework:

- Assures compliance with laws and regulations on quality, safety, and performance
- Safeguards Software AG's ability to support its customers
- Clearly defines transparent processes
- Enables a continuous stream of innovation in an agile development environment

- Builds in feedback to assure that Software AG supplies quality software that creates a competitive advantage for its customers

Software AG Business Continuity Management System: Software AG has designed, deployed, and maintains an ISO 22301 based Business Continuity Management System (BCMS) for Global Support and CloudOps business unit as a supporting function (as well as several other aspects of the Software AG enterprise). Software AG has achieved certification for this standard as evidenced by the ISO 22301 Business Continuity Management System Certificate. The scope of the Software AG Business Continuity plan is set as follows: Global Support (worldwide), including supporting services (Facility Management, Research and Development, IT-Services, Global Communications and Cloud Operations).

This BCMS program encompasses and enhances the security and availability related considerations represented by SOC 2 Trust Services Criteria represented herein. The Software AG Cloud Organization's primary objectives for the BCMS include:

- Ensuring that the Company's services and systems are available to meet its customers as committed and needed.
- Proactive identification of threats and risks that could impair the continuity of Software AG Cloud services, and as appropriate, timely responses to incidents.
- Compliance with legal, regulatory, and contractual requirements.
- Governance structure to provide management timely and complete information to monitor the effectiveness of the BCMS to meet Software AG information risk management objectives.

Software AG Cloud Organization Information Security Management Program (ISMP): The Cloud Information Security Management Program (ISMP) secures Software AG Cloud with the highest industry standards. The ISMP encompasses and enhances the security related considerations represented by SOC 2 Trust Services Criteria as well as ISO 27001, 27017 and ISO 27018 controls. Customers can find further details about the ISMP and independent assurance evidence of security controls on the Software AG website and in the Cloud Security and Compliance fact sheet.

Monitoring Controls: The Software AG Cloud Organization has designed, deployed, and monitors their information security management system (ISMS) in accordance with the ISO 27001:2013, ISO/IEC 27017, and ISO/IEC 27018 standards. Software AG achieved certification for this standard effective on December 27, 2017 and has deployed a monitoring and surveillance audit program to maintain this certification through December 27, 2023.

The Cloud Organization ISMS defines the Company's approach to managing security for cloud services in a holistic, comprehensive manner and provides a suite of information security measures to:

- Protect cloud information assets from unauthorized access, use, disclosure, disruption, modification, inspection, recording, or destruction;
- Proactively identify security risks, prevent, detect, and respond to security breaches and violations;
- Comply with legal, regulatory, and contractual requirements; and
- Adopt an overarching management process to ensure information security controls meet information security needs on an ongoing basis.

The independent third-party auditors' assessment, which validates compliance with the ISO 27001 standard, provides evidence that the Cloud Organization ISMS is comprehensive and in accordance with industry-leading best practices. The certification scope statement lists the standard cloud services in scope of the current ISO/IEC 27001 (along with ISO/IEC 27018 and ISO/IEC 27017 requirements) certification standards.

General requirements for security controls performance evaluation, including monitoring, internal audits and management reviews are described in the Cloud Information Security Policy (CISP). The CISP provides documented evidence of the Software AG Cloud Organization implementation of information security controls and can be provided to customers on request.

Assignment of Authority and Responsibility: Key roles and responsibilities are assigned to individuals responsible for operating the Cloud Services. Team members have the skills and competencies to match their responsibilities and receive annual training to maintain these skills. Team members whose responsibilities involve technical roles have external accreditation. Job descriptions are reviewed and revised as necessary yearly.

Talent Management Policies and Practices: All CloudOps employees must complete the Global Code of Business Conduct training when changes are made and receive performance reviews annually. The CloudOps team and the RnD team also complete an annual cloud security training course lead by the CSCC Team, formally reviewed as part of the ISMS Governance process.

Policies and procedures documents for significant processes, including responsibility for reporting operational failures, incidents, system problems, concerns, and user complaints, are published and available in the process documentation made available to all internal users via the documented incident process model. The CloudOps team reviews and updates Cloud Services procedural documentation on a semi-annual basis or as needed with product updates.

System Descriptions and procedure documents are developed and verified by the CloudOps team to document the system's design and operation, which is used to deliver the Standard Cloud Services. These documents are made available via the intranet for personnel that need them to perform their job.

Organizational charts and procedural documents are in place to communicate key areas of authority, responsibility, and lines of reporting to personnel responsible for the design, development, implementation, operation, monitoring, and maintenance of the system, enabling it to meet the commitments and requirements as they relate to security and availability.

Risk Management: The Information Security risk management program covers all risks potentially impacting the confidentiality, integrity, and/or availability of Software AG cloud services and customer data.

Risk Assessment: An organizational and information technology risk analysis is performed to help enable the Software AG Cloud Organization to establish information technology systems and organizations that provide the security that is required by law and is proportionate to risks. The analysis makes it possible to identify the security flaws of IT systems, as well as instances of implemented controls that are ineffective. Therefore, a mandatory information technology and organizational risk analysis is carried out for CloudOps IT systems and Cloud Organization at least annually.

A risk assessment is further performed in cases where an enhanced or priority new system, system component, or application is deployed; the major version of an existing system or application is changed; or wherever appropriate due to negative external or internal effects.

Risk management is performed according to the Software AG Cloud Organization's risk management program which encompasses the following phases:

- Identify - These efforts identify technical and business risks to the organization and operations.
- Assess – The assessment phase evaluates the potential impact(s) of identified risks, the likelihood of occurrence, and control effectiveness and maturity.
- Mitigate – Mitigation develops risk treatment plans to control or reduce risk where needed, including the implementation of controls, processes, and other physical and virtual safeguards.
- Report – Reporting and communication is performed to help ensure that risk owners and stakeholders, as well as senior leadership, have visibility into risks to the organization and that there is effective decision making around risks.
- Monitor – Identified and assessed risks are periodically reviewed, along with any associated risk response efforts for the risk, to determine if their state or status has changed.

This systematic approach to information security risk management is used to identify organizational needs regarding information security requirements and to create an effective Information Security Management System.

Risk Treatment: Risk treatment options are selected based on the outcome of the risk assessment, the expected cost for implementing these options, and the expected benefits from these options.

Each major risk (High probability and/or high impact) are assigned to a risk owner for monitoring and controlling purposes to ensure that the risk will not “fall through the cracks”.

One of the following approaches will be selected to manage assigned risks:

- Avoid – Eliminate the threat or condition or to protect the project objectives from its impact by eliminating the cause;
- Modify (Mitigate) – Identify ways to reduce the probability or the impact of the risk. Define actions to be taken in response to risks;
- Retain (Accept) – The remaining tread and thus the resulting risk are accepted by the management and management is accountable for the consequences; and
- Transfer – Shift the consequence of a risk to a third party together with ownership of the response by making another party responsible for the risk (buy insurance, outsourcing, etc.).

Review of the Analysis: In the areas affected by actions to reduce risk, the analyses are reviewed at least annually, and any changes or modifications are documented.

Risk Communication and Consulting: All respective stakeholders must be involved to help ensure correct risk handling is applied in all phases of the risk management process.

Risk monitoring and Review: The monitoring and review of the risk management process is not bound to any fixed cycle but is an integral part of all processes in the CloudOps. Risks will be assigned to the Cloud Risk Manager who tracks, monitors, controls, and reports on the status and effectiveness of each risk response action to the Risk Management Program Owner and the Cloud Risk Owner.

6. Control Activities

System Account Management: Only authorized Software AG Support teams such as RnD, Global Cloud Support, and CloudOps members have access to the IaaS provider administration console and the infrastructure of the Cloud service. This access is controlled through a Central Account Management policy where users are assigned roles depending on the requirements of their position. The administrators can only access the IaaS provider administration console using multi-factor-authentication. Within the IaaS provider these roles are governed by a shared Trust Policy, an IaaS provider document in which a definition of roles and responsibilities of all parties are documented. All activity within the IaaS provider is logged and monitored.

Physical access to Software AG’s operations facilities is strictly controlled and monitored via Software AG’s Physical Access Standard. Software AG has implemented a quality management system and is ISO 9001 certified for Global Support and Research & Development, including supporting services (IT-Services, HR, Facility Management, and Global Consulting Services).

Based on the job requirements of the administrators, access rights are reviewed on an annual basis. Access is revoked from all production systems within 24 hours if a team member is terminated or positions are changed. The CloudOps and RnD teams follow enterprise standards regarding identity and access management in alignment with the Access Control Policy as follows:

- The use of generic and shared accounts is prohibited on the network, production applications, associated production databases, and associated infrastructure unless authorized by management,
- The Change Advisory Board reviews the assignment of system users to the accounts monthly, and
- Any identified discrepancies are reported to management for corrective action.

Data Transfer: Transfer of customer data outside the cloud service environment must be customer approved and in accordance with Information Transfer Security Requirements of the Communication Security Policy. Neither CloudOps nor a third-party IaaS Supplier will transfer customers' tenant content from the data centers of the IaaS Supplier Region unless required to comply with the law or requests of governmental entities or instructed by customer. CloudOps will notify customer as applicable.

Cryptography: Tenant data coming to or leaving from the cloud environment is transmitted through encrypted protocols with up-to-date encryption ciphers. Data-at-rest managed by CloudOps is protected using IaaS provider encryption capabilities according to the Cryptographic Controls Policy. Administrative access to the IaaS provider console is provided via encrypted protocols with up-to-date encryption ciphers, and access to the OS-level of hosted resources is implemented via SSH/RDP using individual key-pairs. Cryptographic controls are provided by Software AG's ISO 27001 compliant IaaS Supplier's in compliance with all relevant agreements, legislation, and regulations.

Data Backup and Recovery Management: Cloud Customers expect that support services are available at all times to safeguard the continuity of their business systems. To help ensure full support of Cloud Products, a Business Continuity and Disaster Recovery (BC/DR) policy for Software AG Global Support (and supporting functions) according to ISO 23001 standards has been enacted.

Like any other cloud platform, Cloud Products are exposed to potential risks that could disrupt business functions. The strategy for continuing business in the event of a major incident is to help ensure the safety and security of employees and to continue business functions and services from predefined alternative sites or restore business functions within the agreed upon SLA, RTO, and RPO. The BC/DR plan is tested and reviewed annually.

Incident Management: After a support incident is created, it is assigned to a Software AG Security Operations Center representative. The SOC classifies the issue, they will determine whether the incident requires the establishment of a Security Incident Response Team according to the specific classification. If RnD has to be involved in an incident, an iTrac issue is created and all details to the incident are exchanged via iTrac between Global Support or CloudOps and RnD. iTrac is the ticketing system used for all development and production changes for products and cloud environments.

In addition to submitting support incidents in the customer facing ticketing system, customers may submit suggestions or product enhancements via Brainstorm or product specific tools as described in cloud services specific description. This tool will alert the Product Management team of the customer's request and permit the team to determine if it is an issue or valid opportunity for a product enhancement. If the Product Management team determines that it is an issue, then it will be routed to the proper RnD or CloudOps team and will be managed in the iTrac ticket system.

For incidents that are a level 1 or 2 in severity (customer data is exposed, system cannot be used, threat of repetition of attack), an iTrac Alert type ticket is created. The Incident Manager and the Security Incident Response Team review and determine appropriate steps. For Severity 1 incidents, the customer(s) will be notified within four hours of discovery. For Severity 2 incidents, the customer(s) will be notified within 24 hours of discovery. The notification method for Cloud Enterprise customers is through an incident ticket. The notification method for the public Cloud environment is through a Security Alert. Customers can subscribe to all alerts per product for direct email notification.

Change Management: Software AG Cloud Products update processes help ensure a smooth upgrade with minimal customer impact. All changes to production cloud services, including software updates, application/product changes, and virtual infrastructure changes are planned, evaluated, tracked, implemented, and verified based on an established change management process. Data Center level security solutions and a SIEM solution are in place to log and alert on any changes to the production environments.

The steps for a product change are documented and tracked in a tracking tool (iTrac). The tracking tool is used to document the changes, any anomalies, and to log a pass or fail status for each phase of the change. As part of the Change Management process, every phase (development, test, and QA) of the change must receive a pass status before the next phase in the change can be started. Version control software is also incorporated as part of the lifecycle process. This process helps ensure that no issues or disruptions take place when a scheduled change is migrated into the production environment. In addition, security testing is performed prior to a change release.

The same Change Management Lifecycle process is used to address required changes around deficiencies or issues discovered by the users. All changes of this type go through a review board process, are accompanied by a detailed test plan, documentation of changes, implementation plan, risk mitigation plan, production manager approval, and user approval/agreement before the change is migrated to the user's production environment.

Customers are provided with the releases notes through the Empower portal. Planned maintenance windows are available at the Software AG Cloud Trust Site, and announcements of new cloud releases are available in Empower.

7. Platform Monitoring

Monitoring Controls: Based on ISO/IEC 27001, ISO/IEC27017 and ISO/IEC27018, CloudOps maintains and improves the security controls monitoring processes through verification, monitoring, and assessing performance of controls against organizational policies and objectives and reporting the results to management for review.

The Security Controls review process calls for a check on all security controls and measures for their effectiveness and suitability for the cloud environment. Furthermore, based on the records of these monitored areas, management provides evidence of verification and traceability of corrective, preventive, and improvement actions regarding security controls. In addition, an annual review of controls is performed and ineffective controls as well as invalid controls are removed, while improved and new controls may be implemented. CloudOps and CSCC management is involved in the review process and approves the final control matrix and the performance of each control. General requirements for security controls performance evaluation, including monitoring, internal audits, and management reviews are described in the Cloud Information Security Policy.

Monitoring Procedures: The IaaS provider maintains responsibility for monitoring the IaaS infrastructure used by Software AG, while CloudOps is responsible for monitoring activity and usage within the boundary of Software AG's cloud environment through the use of audit logs, logging analysis and alerting tools, and data visualization tools. CloudOps configures Network Time Protocol (NTP) on all IaaS provider instances, and the systems time is synchronized with a load-balanced pool of public servers on the Internet. These data points from system components and endpoints allow CloudOps to monitor system performance, potential security threats and vulnerabilities, resource utilization, and detection of unusual system activity. The CloudOps team receives alerts when the log data triggers certain performance metrics (such as an instance is not responding), a capacity warning, or a latency issue. Depending on the severity of the alert, the responsible team member will review and perform the necessary remediation. If the actions involve the production architecture or the RnD product team, an iTrac ticket is created to document the remediation steps.

All logs of system activity are stored for at least 90 days and are protected from loss, destruction, falsification, unauthorized access, and unauthorized release as described in accordance with legislative, regulatory, contractual, and business requirements.

The CloudOps team also proactively identifies system improvements using IaaS provider tools and additional third-party tools listed in the Software section of this Report, which provide optimization and best practice recommendations. This information is provided to support teams such as Product Management or RnD for enhancements. Within the Cloud infrastructure, all servers are equipped with the infrastructure protection tool "Trend Micro Deep Security" that provides anti-virus protection, network intrusion detection and prevention, and integrity monitoring. Along with selected IaaS provider tools, TrendMicro is used to alert the CloudOps team to proactive ways to improve security through network hardening and patching. The tool also identifies potential security incidents. Cloud System Administrators review security logs and virus scan alerts on a weekly basis. Also, Administrators review weekly security status reports from these third-party tools and address them in the regular Product Change Advisory sessions as needed. The IaaS provider provides vulnerability scanning and base OS patching services as part of their general practices relating to their infrastructure. Any issues noted that could affect any IaaS provider customers, such as Software AG, are reported to them.

Service Monitoring Customer Capabilities: Customers can monitor Cloud Services availability via the Software AG Cloud Trust Site. Customers can access applications logs via the specific interface of the cloud application. Additional Information about service configuration and monitoring is available in the respective product documentation.

8. Security Testing

Security in Development: Software AG Cloud Products have a rigorous software design and development processes. RnD follows industry standards such as OpenSAMM for Software Development Lifecycle Management. RnD performs design reviews to verify the built-in security features and to identify any missing security features. The security team performs scans on third-party component to identify any vulnerabilities. In addition, manual penetration tests, log analysis, session mismanagement, platform specific attacks, etc., are performed on all the interfaces provided by the application. Any vulnerability noted is incorporated into the risk assessment process.

Security Static Analysis: Source code is scanned using a static code analysis tool. Security experts perform the review before every release cycle of the Cloud products.

Security Dynamic Analysis: The process involves per release application testing using the Software AG Cloud web interface just as an external attacker would do without code access. Dynamic scanning tools are used that assist in identifying a wide variety of vulnerabilities, which primarily include:

- Input/output validation such as cross-site scripting, and SQL injection;
- Specific application problems;
- OWASP vulnerabilities;
- CWE vulnerabilities.

Security Penetration Testing: For all of the Cloud hosted products, the Software AG RnD security team performs security penetration testing based on OWASP top 10 for each cloud release.

In addition, Cloud Security, Compliance, and Certifications engages with an external security testing company to perform regular penetration test for standard cloud services. Customers can request the latest summary test results and remediation plans to plan their respective vulnerability management process accordingly.

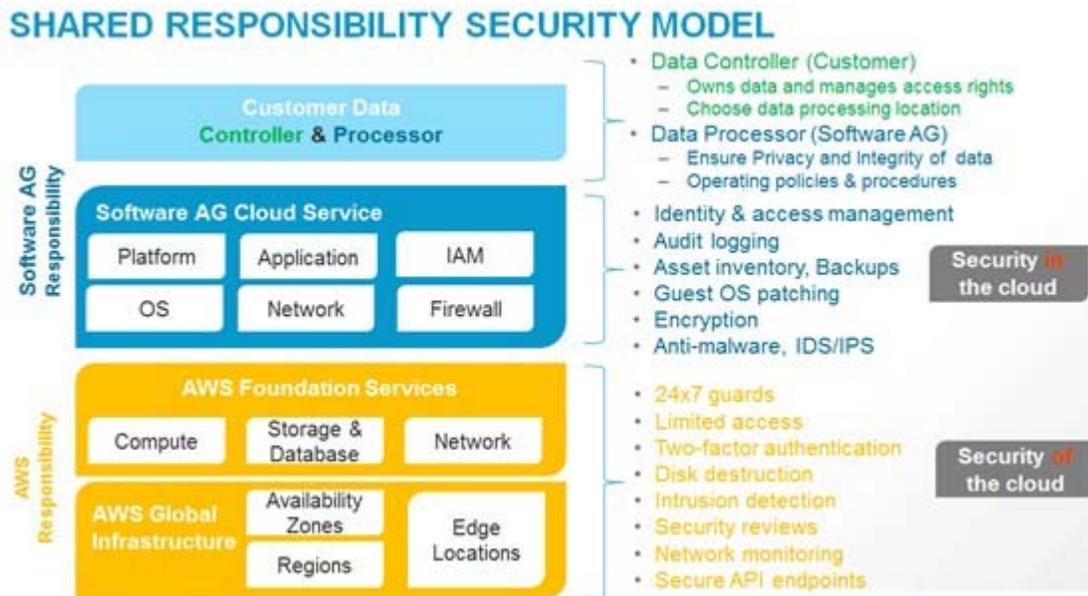
9. Subservice Organization Amazon Web Services (AWS)

AWS Services Description Overview: Software AG Cloud Services are based upon infrastructure services provided by AWS and an installation of Software AG's respective standard products.

Software AG has a strategic partnership with Amazon Web Services (AWS). Software AG is an All-In Technology Partner of AWS and benefits from the AWS Well-Architected Program.

1. AWS provides cloud Infrastructure as a service (IaaS) for Software AG Cloud products including real-time duplication of server infrastructure.
2. AWS provides vulnerability scanning and base hardware patching services as part of their general practices relating to their infrastructure. Any issues noted that could affect any AWS customers, such as Software AG, are reported to them.
3. Physical access to the AWS data centers is strictly controlled and audited according to their ISO 27001 and SOC 2 controls.
4. AWS provides secure data deletion capabilities according to AWS DoD standards. AWS uses the techniques detailed in DoD 5220.22-M “National Industrial Security Program Operating Manual “or NIST 800-88 “Guidelines for Media Sanitization” to destroy data as part of the decommissioning process. If a hardware device is unable to be decommissioned using these procedures, the device will be degaussed or physically destroyed in accordance with industry-standard practices.

AWS Supplier Management: A clear definition of roles and responsibilities for Software AG and AWS provides Software AG customers the needed transparency and trust that their services and data, systems, and applications are highly secure and available. Software AG and AWS share responsibility for operating the Software AG cloud infrastructure using AWS services as shown in the figure below.



Software AG Responsibilities: Software AG CloudOps is responsible for the software components placed on the cloud; the management (including updates and security patches) of the guest operating system; the configuration of the AWS provided security group firewall; and other security-related features. The Software AG Cloud Organization complies with the AWS Acceptable use policy. The Cloud Security, Certifications, and Compliance team reviews reports and certificates including, but not limited to, SOC 2 reporting and ISO 27001 certificates, from independent parties for evidence that AWS is fulfilling their contractual obligations as documented in agreements with Cloud products. For more information, please see the following:

- AWS Cloud Compliance;
- AWS Risk and Compliance Whitepaper;
- AWS Security Whitepaper.

AWS Responsibilities: AWS operates, manages, and controls the components of the host operating system from virtualization layer down to physical security of the facilities where the AWS services operate. AWS is responsible for all physical access controls to IaaS for Software AG Cloud Services:

Applicable AWS Services

Infrastructure Services

- **AWS VPC:** A Virtual Private Cloud (VPC) service instance from AWS secures the customer's service installation against intrusion. Amazon VPC (Virtual Private Cloud) is used to provide a private, isolated section of the AWS Cloud where AWS resources are launched in a defined virtual network.
See <http://aws.amazon.com/vpc/>
- **AWS EC2:** Amazon EC2 provides resizable compute capacity in the cloud. EC2 (Elastic Cloud Compute) is the virtual computing environment with the Operating System. It is used for the deployment of the Cloud software and workloads of web application, application server and additional Cloud components.
See <http://aws.amazon.com/ec2/>
- **AWS S3:** Amazon S3 (Simple Storage Service) provides a fully redundant data storage infrastructure. The AWS S3 instance is used to securely store all log information, for example the event monitoring and application log information etc.
See <http://aws.amazon.com/s3/>
- **AWS ROUTE 53:** Amazon Route 53 is a highly available and scalable Domain Name System (DNS) web service, which is used for accelerated content delivery of the Cloud to remotely located users by setting up a dedicated domain name for the customer.
See <http://aws.amazon.com/route53/>
- **AWS Relational Database Service:** Amazon Relational Database Service (RDS) is used to set up, operate, and scale a SQL Server database in the cloud. It provides cost-efficient and resizable capacity while managing time-consuming database administration tasks.
See <https://aws.amazon.com/rds/>
- **AWS Elastic File System:** Amazon Elastic File System (EFS) provides a simple, scalable, elastic file system for Linux-based workloads for use with AWS Cloud services.
See <https://aws.amazon.com/efs/>
- **AWS Directory Service:** AWS Directory Service is a managed service that is used to connect the Cloud end users with an existing on-premises Microsoft Active Directory at customer location.
See <https://aws.amazon.com/directoryservice/>
- **AWS Identity & Access Management:** AWS Identity and Access Management (IAM) is used to securely control access to AWS services and resources for dedicated members of the Operations team including the AWS Directory Services in which they are entitled.
See <https://aws.amazon.com/iam/>
- **AWS Key Management Service (KMS):** AWS Key Management Service is a managed service that enables users to create and control the encryption keys used to encrypt data and uses Hardware Security Modules to protect the security of keys. AWS Key Management Service is integrated with several other AWS services to help in protecting the data stored with these services. AWS Key Management Service is also integrated with AWS CloudTrail to provide users with logs of all key usage to help meet users' regulatory and compliance needs.
See <http://aws.amazon.com/kms/>
- **AWS Lambda:** AWS Lambda allows users to run code without provisioning or managing servers.
See <http://aws.amazon.com/lambda/>

- **AWS Simple Email Service (SES):** Amazon SES (Simple Email Service) is a highly scalable and cost-effective bulk and transactional email-sending service for the cloud. It is used to configure the SMTP service related to the webMethods Cloud software and for notifications to the webMethods CloudOps Team related to the AWS Lambda configuration.
See <http://aws.amazon.com/ses/>
- **Amazon Simple Queue Service (SQS):** Amazon Simple Queue Service is a fast, reliable, scalable, fully managed message queuing service.
See <http://aws.amazon.com/sqs/>
- **AWS Simple Notification Service (SNS):** Amazon Simple Notification Service is a fast, flexible, fully managed push notification service that allow users to send individual message or to fan-out messages to large numbers of recipients. Amazon SNS makes it simple and cost effective to send push notifications to mobile device users, email recipients, or even send messages to other distributed services.
See <http://aws.amazon.com/sns/>

Security and Monitoring Services

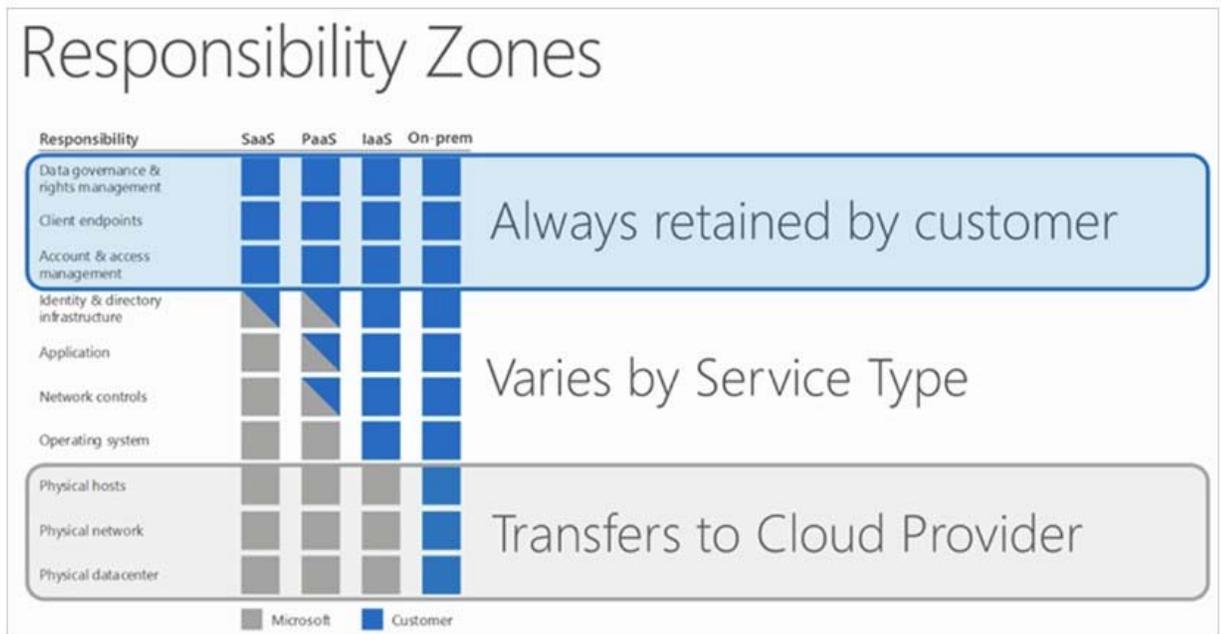
- **AWS Config:** AWS Config is a fully managed service that provides users with an AWS resource inventory, configuration history, and configuration change notifications to enable security and governance.
See <http://aws.amazon.com/config/>
- **AWS Inspector:** AWS Inspector is an automated security assessment service that helps improve the security and compliance of applications deployed on AWS.
See <https://aws.amazon.com/inspector/>
- **AWS Security Hub:** AWS Security Hub provides a comprehensive view of high-priority security alerts and security posture across production AWS accounts.
See <https://aws.amazon.com/security-hub/>
- **AWS Guard Duty:** Amazon GuardDuty is a threat detection service that continuously monitors for malicious or unauthorized behavior to help protect our AWS accounts and workloads.
See <https://aws.amazon.com/guardduty/>
- **AWS Trusted Advisor:** AWS Trusted Advisor helps in provisioning resources by following best practices. AWS Trusted provides a general overview of all related AWS resources regarding Cost Optimizing, Performance, Security, and Fault Tolerance.
See <https://aws.amazon.com/premiumsupport/trustedadvisor/>
- **AWS CloudTrail:** The AWS CloudTrail web service records AWS API calls and delivers log files. These log files are being stored in the S3 instance.
See <http://aws.amazon.com/cloudtrail/>
- **AWS CloudWatch:** Amazon CloudWatch provides monitoring for AWS cloud resources. Respective log files are stored in the S3 instance.
See <http://aws.amazon.com/cloudwatch/>
- **AWS System Manager:** Amazon System Manager provides visibility and control of the AWS IaaS infrastructure. It provides a unified user interface to view operational data from multiple AWS services and allows automation of operational tasks across AWS resources.
See <https://aws.amazon.com/systems-manager/>

10. Subservice Organization Microsoft Azure

Azure Service Description Overview: Software AG Cloud Services are based upon infrastructure services provided by Microsoft Azure and an installation of Software AG's respective standard products.

1. MS Azure provides cloud IaaS for Software AG Cloud products including real-time duplication of server infrastructure.
2. MS Azure provides vulnerability scanning for the underlying Azure-managed infrastructure and cloud network perimeter as well as base hardware patching services as part of their general practices relating to their infrastructure. Any issues noted that could affect any Azure customers, such as Software AG, are reported to them.
3. Physical access to the MS Azure data centers is strictly controlled and audited according to their ISO 27001 and SOC 2 controls.
4. MS Azure provides secure data destruction capabilities when customers delete data or leave Azure. Microsoft follows strict standards for overwriting storage resources before their reuse, as well as the physical destruction of decommissioned hardware. Microsoft executes a complete deletion of data on customer request and on contract termination.

Azure Supplier Management: Software AG has a strong partnership with Microsoft and is a long-term Microsoft customer for Office Productivity Software. A clear definition of roles and responsibilities for Software AG and Microsoft Azure provides Software AG customers the needed transparency and trust that their services and data, systems, and applications are highly secure and available. The following responsibility matrix shows the areas of the stack in a software-as-a-service (SaaS), PaaS, and IaaS deployment that Software AG (Customer) is responsible for and Microsoft is responsible for.



Software AG Responsibilities: Software AG CloudOps is responsible for the software components placed on the cloud; the management (including updates and security patches) of the guest operating system; the configuration of the network configurations; and other security-related features. The Cloud Security, Certifications, and Compliance team reviews reports and certificates including, but not limited to, SOC 2 reporting and ISO 27001 certificates, from independent parties for evidence that Microsoft Azure is fulfilling their contractual obligations as documented in agreements with Cloud products. For more information, please review respective Microsoft documentations.

Microsoft Azure Responsibilities: Microsoft operates, manages, and controls the components of the host operating system from virtualization layer down to physical security of the facilities where the Azure services operate.

Microsoft is responsible for all physical access controls to IaaS for Software AG Cloud Services:

Applicable Azure Services

Infrastructure Services

- Azure Virtual Networks: Provide an isolated, private environment in the cloud. Users have control over their virtual networking environment, including selection of their own IP address range, creation of subnets, and configuration of route tables and network gateways.
- Azure Virtual Machines: Virtual servers allow users to deploy, manage, and maintain OS and server software. Instance types provide combinations of CPU/RAM. Users pay for what they use with the flexibility to change sizes. Amazon EC2 provides resizable compute capacity in the cloud.
See Azure Virtual Machines
- Azure Virtual Machines scale set: Azure virtual machine scale sets let users create and manage a group of identical, load balanced VMs.
- Azure Kubernetes Services: Azure Kubernetes Service (AKS) makes it simple to deploy a managed Kubernetes cluster in Azure. AKS reduces the complexity and operational overhead of managing Kubernetes by offloading much of that responsibility to Azure.
- Azure Container Instances: Azure Container Service allows to quickly deploy a production-ready Kubernetes, DC/OS, or Docker Swarm cluster
- Azure Blob Storage: Object storage service, for use cases including cloud applications, content distribution, backup, archiving, disaster recovery, and big data analytics.
- Azure DNS & Traffic Manager: A service that hosts domain names, plus routes users to Internet applications, connects user requests to datacenters, manages traffic to apps, and improves app availability with automatic failover
- Azure SQL Database, Database for MySQL and Database for PostgreSQL: A globally distributed, multi-model database that natively supports multiple data models: key-value, documents, graphs, and columnar.
- Azure Active Directory Domain Services + Windows Server Active Directory on Azure IaaS: Comprehensive identity and access management cloud solution that provides a robust set of capabilities to manage users and groups. It helps secure access to on-premises and cloud applications, including Microsoft online services like Office 365 and many non-Microsoft SaaS applications.
- Azure Active Directory: Allows users to securely control access to services and resources while offering data security and protection. Create and manage users and groups and use permissions to allow and deny access to resources.
- Azure Storage Service Encryption: Helps organizations protect and safeguard their data and meet their organizational security and compliance commitments.
- Azure Key Vault: Provides security solution and works with other services by providing a way to manage, create, and control encryption keys stored in hardware security modules (HSM).

Security and Monitoring Services

- Azure Advisor: Provides analysis of cloud resource configuration and security so subscribers can ensure they're making use of best practices and optimum configurations.
- Azure Security Center: An automated security assessment service that improves the security and compliance of applications. Automatically assess applications for vulnerabilities or deviations from best practices.

- Azure Defender: A service that provides security alerts and advanced threat protection for virtual machines, SQL databases, containers, web applications, the users network, and more.
- Azure Network Security Groups: Used to filter network traffic to and from Azure resources in an Azure virtual network. A network security group contains security rules that allow or deny inbound network traffic to, or outbound network traffic from, several types of Azure resources.
- Azure Web Application Firewall (WAF): A service that provides real-time protection for web apps.
- Azure Monitor: Provides monitoring for Azure cloud resources.

11. Software AG Cloud platform on Amazon Web Services (AWS)

SAG Cloud Services Specific Description

SAG Cloud is an umbrella product providing a subscription to Software AG Cloud free trials. It provides a centralized entry point for subscribing to Software AG free trials that are hosted on the Software AG cloud. Customers can subscribe through SAG Cloud for trials of Alfabet Fastlane, ARIS Cloud Advanced, Cumulocity IoT and webMethods suite of products (Agile Apps cloud, webMethods Integration Cloud, API Cloud). SAG Cloud is currently rolled out in Oregon (US West) and Frankfurt (EU) regions. SAG Cloud is not covered by the scope of this report.

Components Relevant to the SAG Cloud Platform

SAG Cloud is built to aid in easier self-service and a common entry point into product subscription for Software AG products in the cloud.

In its essence, SAG Cloud is a thin wrapper that consists of a web interface and a tenant and identity management module that maintains the customer life cycle and subscriptions (together with provisioning) to Software AG products described above (see SAG Cloud Services Specific Description)

SAG Cloud Service Specific Software

- *Linux Operating System:* SAG Cloud server instances are running Linux Operating system and are licensed through AWS on their EC2 service.
- *KeyCloak Database:* KeyCloak database is used for storing subscription details of customers, used for identity and management.
- *Temporal Database:* This database used for storing workflow of the customer environment.
- *Akamai:* Akamai is used for support staff to the bastion hosts for access and troubleshooting operational issues.
- *EKS:* EKS is used for operational and product requirements built in, providing Immutable Infrastructure. EKS uses amazon provided AMIs for Kubernetes cluster.
- *CA3S:* CA3S is used to deploy the infrastructure, consisting of built product AMIs together with supporting infrastructure such as load-balancers and EKS clusters.
- *CAS, Prometheus and Splunk:* CAS, Prometheus and Splunk tools are used for performance, and availability monitoring of customer's Cloud Service components and resources.
- *CLS:* CLS is used for log management and analysis of customer's Cloud infrastructure components and resources.
- *Statuspage:* Statuspage is used for report availability monitoring of customer's Cloud Service components and resources.
See <https://webmethods.statuspage.io/>
- *OpsGenie:* OpsGenie to communicate and track alerts about customer's Cloud infrastructure components and resources health.
See <https://softwareag.app.eu.opsgenie.com/>

- *Trustside*: Trustside is used for customer communication/notification for report availability monitoring of customer's Cloud Service components and resources.

SAG Cloud Procedures

Customer Onboarding: The following details covers the full SAG Cloud customer onboarding scenario:

- A user goes to softwareag.cloud and signs up for a product
- Fills details in global sign-up page,
 - Block the requests from blocked countries
 - Used domain can't be taken
- On successful validation,
 - Information send to Marketo (Software AG department)
 - Product and IDM are provisioned.
- On successful product provisioning, individual products send e-mail to customer with tenant access details.
- Customer follows the link in e-mail
 - User is redirected to SAG Cloud Login page
 - On successful authentication, user goes back to product.
- User stays back in browser and clicks the Login link of the product
 - User is taken to the signed-up product
- User stays back in browser and clicks the Login link of My cloud
 - User is taken to the my cloud page
- User goes to Marketing site and clicks Login
 - User is asked for subdomain and routed to region specific IDM
 - Post login, user is taken to My cloud page
- Tenant Admin logs in (via marketing site and clicks mycloud or mycloud URL) and start user on boarding.
 - User on-boarding triggers an e-mail with change password link which also verifies e-mail.
 - Post password change, user goes to product directly.
- Admin logs in (via marketing site and clicks mycloud or mycloud URL)
 - User administration is shown only to admin
 - Changes the password policy
 - Locks the user account (disable the user in IDM)
 - Admin changes the password and other user details.
 - Can subscribe to a product
 - Only one active trial per product
 - Not more than 3 is allowed
- User logs into My cloud
 - Change password and other user attributes
 - Can see all the subscribed products and can navigate to products
- User is able to switch between marketing content and my cloud content seamlessly
- Marketing site will show mycloud link and user detail at the right post login
- (Optional) In cases of a purchased cloud product (i.e. non-trial), Logistics and RnD update the license limits and expiration date according to the contract.

12. Software AG Cloud platform on Microsoft Azure

SAG Cloud Services Specific Description

SAG Cloud is an umbrella product providing subscription to Software AG Cloud free trials. It provides a centralized entry point for subscribing to Software AG free trials that are hosted on the Software AG cloud. Customers can subscribe through SAG Cloud for trials of Alfabet Fastlane, ARIS Cloud Advanced, Cumulocity IoT and webMethods suite of products (Agile Apps cloud, webMethods Integration Cloud, API Cloud). SAG Cloud is currently rolled out in Oregon (US West) and Frankfurt (EU) regions. SAG Cloud is not covered by the scope of this report.

Components Relevant to the SAG Cloud Platform

SAG Cloud is built to aid in easier self-service and a common entry point into product subscription for Software AG products in the cloud.

In its essence, SAG Cloud is a thin wrapper that consists of a web interface and a tenant and identity management module that maintains the customer life cycle and subscriptions (together with provisioning) to Software AG products described above (see SOFTWARE AG Cloud Services Specific Description).

- *KeyCloak Database:* KeyCloak database is used for storing subscription details of customers, used for identity and management.
- *Temporal Database:* This Database used for storing workflow of the customer environment
- *Akamai:* Akamai is used for support staff to the bastion hosts for access and troubleshooting operational issues
- *EKS/AKS:* AKS is used for operational and product requirements built in, providing Immutable Infrastructure. AKS uses Azure provided AMIs for Kubernetes cluster. EKS is used for operational and product requirements built in, providing Immutable Infrastructure. EKS uses amazon provided AMIs for Kubernetes cluster.
- *CA3S:* ca3s is used to deploy the infrastructure, consisting of built product AMIs together with supporting infrastructure such as load-balancers and EKS AKS clusters.
- *CAS, Prometheus and Splunk:* CAS, Prometheus and Splunk tools are used for performance, and availability monitoring of customer's Cloud Service components and resources.
- *CLS:* CLS is used for log management and analysis of customer's Cloud infrastructure components and resources.
- *Statuspage:* Statuspage is used for report availability monitoring of customer's Cloud Service components and resources.
See <https://webmethods.statuspage.io/>
- *OpsGenie:* OpsGenie to communicate and track alerts about customer's Cloud infrastructure components and resources health.
See <https://softwareag.app.eu.opsgenie.com/>
- *Trustside:* Trustside is used for customer communication/notification for report availability monitoring of customer's Cloud Service components and resources.

SAG Cloud Procedures

Customer Onboarding: SAG Cloud customer scenarios in full scope

- A user goes to softwareag.cloud and signs up for a product
- Fills details in global sign-up page
 - Block the requests from blocked countries
 - Used domain can't be taken

Software AG Cloud

SOC 3[®] Report - SOC for Service Organizations: Trust Services Criteria for General Use
webMethods Cloud System

- On successful validation,
 - Information send to Marketo (Software AG department)
 - Product and IDM are provisioned.
- On successful product provisioning, individual products send e-mail to customer with tenant access details.
- Customer follows the link in e-mail
 - User is redirected to SAG Cloud Login page
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- User stays back in browser and clicks the Login link of the product
 - User is taken to the signed-up product
- User stays back in browser and clicks the Login link of My cloud
 - User is taken to the my cloud page
- User goes to Marketing site and clicks Login
 - User is asked for subdomain and routed to region specific IDM
 - Post login, user is taken to My cloud page
- Tenant Admin logs in (via marketing site and clicks mycloud or mycloud URL) and start user on boarding.
 - User on-boarding triggers an e-mail with change password link which also verifies e-mail.
 - Post password change, user goes to product directly.
- Admin logs in (via marketing site and clicks mycloud or mycloud URL)
 - User administration is shown only to admin
 - Changes the password policy
 - Locks the user account (disable the user in IDM)
 - Admin changes the password and other user details.
 - Can subscribe to a product
 - Only one active trial per product
 - Not more than 3 is allowed
- User logs into My cloud
 - Change password and other user attributes
 - Can see all the subscribed products and can navigate to products
- User is able to switch between marketing content and my cloud content seamlessly
- Marketing site will show mycloud link and user detail at the right post login
- (Optional) In cases of a purchased cloud product (i.e. non-trial), Logistics and RnD update the license limits and expiration date according to the contract.

Service Level Reporting

As specified in the cloud contract service attachment, the service availability SLA is 99.5%. The customer can subscribe for notifications on the Software AG Cloud trust site <https://trust.softwareag.com/sagcloud/status/>.

SAG Cloud Data

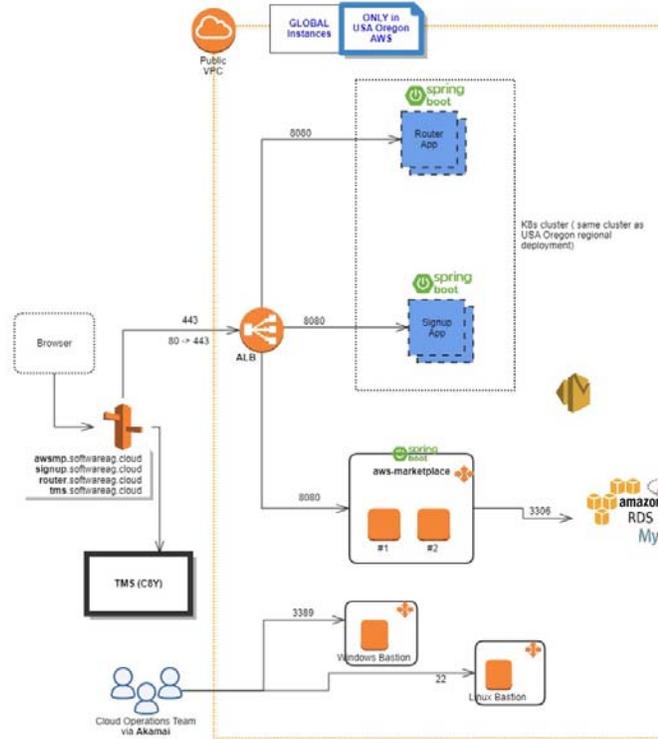
SAG Cloud is a supporting umbrella product that aids in the self-service of product registration and management of a product suite. As such, customer data is stored in the specific product that SAG Cloud offers access to. The KeyCloak database is a highly scalable and multi-node distributed databases that is scaled over multiple regions and multiple shard farms, guaranteeing fast recovery in case of failure and duplication of the underlying data.

Software AG Cloud

SOC 3[®] Report - SOC for Service Organizations: Trust Services Criteria for General Use
webMethods Cloud System

SAG Cloud Architecture

SAG Cloud consists of region-specific and global infrastructure.



Service Level Reporting

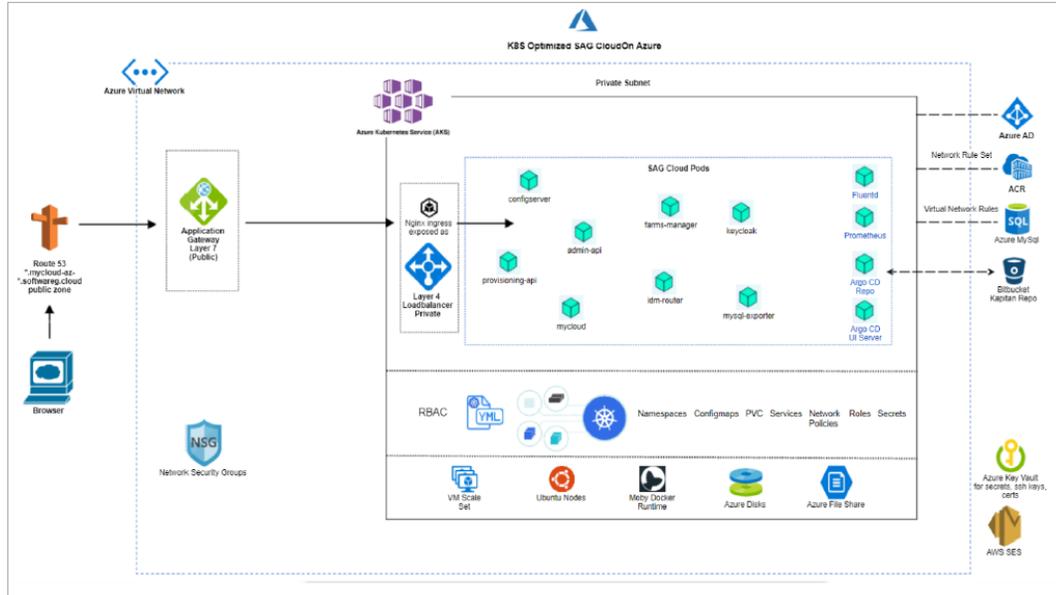
As specified in the cloud contract service attachment service availability is 99.5%. The customer can subscribe for notifications on the Software AG Cloud trust site <https://trust.softwareag.com/sagcloud/status/>.

SAG Cloud Data

SAG Cloud is a supporting umbrella product that aids in the self-service of product registration and management of a product suite. As such, customer data is stored in the specific product that SOFTWARE AG Cloud offers access to. The KeyCloak database is a highly scalable and multi-node distributed databases that is scaled over multiple regions and multiple shard farms, guaranteeing fast recovery in case of failure and duplication of the underlying data.

SAG Cloud Architecture

SAG Cloud consists of region-specific and global infrastructure.



13. webMethods Cloud System Services Specific Description

webMethods Cloud provides foundation services to the Software AG Cloud Platform as well as specific webMethods cloud services functionality.

webMethods Integration Cloud

webMethods Integration Cloud is Software AG’s Integration Platform-as-a-Service (iPaaS) offering. It enables organizations to quickly and easily integrate Software-as-a-Service (SaaS) applications such as Salesforce and SuccessFactors. Additionally, it also facilitates a secure and reliable way to integrate SaaS applications with the organization’s on-premises hosted ERP, CRM, and warehouse applications such as SAP systems and Oracle ebusiness suite. webMethods Integration Cloud includes the following features:

- Seamless integration of SaaS applications;
- Secure and reliable integration with on-premises hosted applications;
- User Interface supporting guided development for faster development and deployment;
- Sophisticated orchestration using easy-to-use graphical design language;
- Connectivity to many popular SaaS applications;
- Web Services with a SOAP connector;
- FTP servers for file transfers with a FTP/FTPS connector;
- Flat File application;
- Database connector;
- Development of Integrations can be versioned in the system;
- Support for full development life cycle with stages;
- Multi-tenant architecture which scales elastically based on demand;
- Assets can be segregated under different projects, a project is an independent entity and corresponds to a folder for organizing your assets.

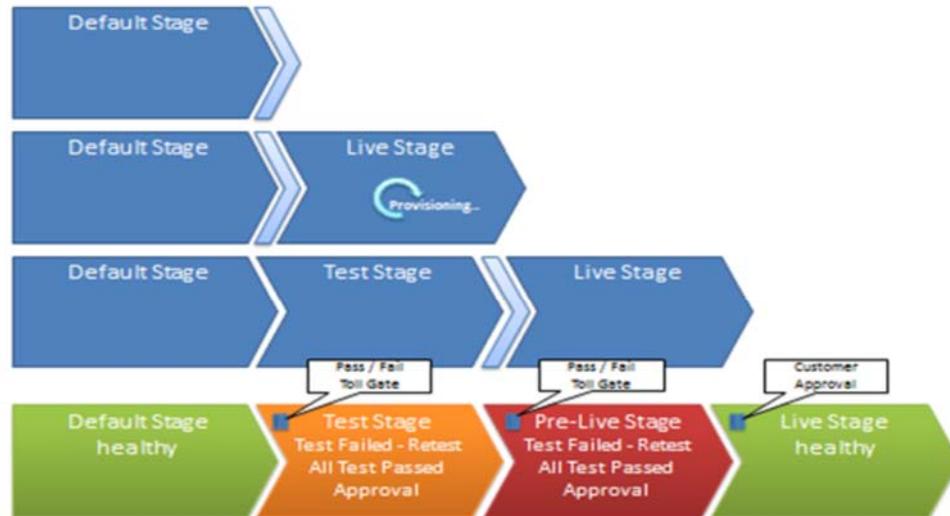
webMethods Integration Cloud provides a way to eliminate integration silos that arise when adding new cloud-based applications to your SaaS environment. Customers can seamlessly integrate applications hosted in public or private clouds, as well as applications hosted on premise. With webMethods Integration Cloud, organizations can standardize a single integration technology.

Core Features

- *User Interface:* webMethods Integration Cloud's user interface is built for business users and citizen developers. The user interface supports guided development and wizards to help users create integrations. The user interface runs on all latest browsers and on the tablets.
- *Sophisticated Service Orchestration:* webMethods Integration Cloud's graphical user interface provides easy to use graphical design language to build complex integrations involving multiple applications and other integrations. This graphical design language is easy enough to use by non-integration specialists/non-IT professionals.
- *Application Connectors:* webMethods Integration Cloud provides connectivity to many SaaS applications, some of which are Salesforce CRM, ServiceNow, Strikelron, Amazon SQS, Amazon S3, Microsoft Dynamics CRM, and SuccessFactors HCM. In addition, webMethods Integration Cloud provides the FTP/FTPS connector for connection to FTP servers for file transfers and the SOAP connector to consume and communicate with Web Services. webMethods Integration Cloud allows users to define multiple accounts to connect to these applications and define operations over these applications, which can be used in Integrations.
- *Mapping, Transformation & Enrichment:* Mapping, transformation, and enrichment are the core strengths of the webMethods Integration platform and now these capabilities are available to cloud users as well. Mapping and transformation capability can be utilized by simple drag-and-drop user interface, which a citizen developer can easily use.
- *Integration Agent:* webMethods Integration Cloud enables organizations to integrate their applications with those of their partners, as well as their own on-premises applications by providing a lightweight agent.
- *Stages and Development Lifecycle:* webMethods Integration Cloud allows organizations to manage their development lifecycle by providing multiple environments one for each stage in their development lifecycle. Up to three such environments called Stages can be created, i.e., Default, Test, and Live. Integrations and their referred assets, like operations, can be promoted from one stage to another enabling the organizations to implement rigorous software development life-cycle process in the cloud.

The Integration Cloud will provide the customers with stages on which versions of the integrations will work. There will always be one stage called "Default." In cases where customers are not entitled to more stages, the whole staging management process will be performed in the default stage.

For customers that have additional stages enabled, the staging management life cycle will look as follows:



Promotions from one stage to another includes a strong Change Management process, which mitigates the risk of unscheduled outages during the migration to the production environment and thereafter. A series of tests and approvals have to be passed before moving from one stage to the next. Any tests or steps that fail during a preproduction stage require a root-cause-analysis of the issue, a fix, and a retest before a passing mark and approval to move to the next stage can be received.

Components Relevant to webMethods Integration Cloud Systems

webMethods Integration Cloud (wMIC) is deployed using IaaS provider services where customers share central resources but are virtually segregated. Customers can purchase either Integration Cloud Basic, Advanced or Enterprise levels which grant additional dedicated virtual Integration Server instances to the tenant.

The webMethods platform is available in two regions – the United States and Europe. Customers can select the best region to host their tenant in order to meet their connectivity needs. Tenant resources are deployed across at least two data centers within a region active/active for High Availability.

wMIC Cloud Logical Deployment Architecture

wMIC is a multi-instance single Tenant Architecture. All tenants share the same cloud infrastructure where all data and business logic is physically isolated per tenant. Tenants cannot disrupt each other as they do not share computing resources. The elastic scalable architecture helps to ensure that resources can be switched on and off during runtime in order to adapt capacity to your actual needs. Intelligent routing routes requests from users and SaaS applications to the correct tenant specific computing resources.

wMIC AWS Architecture

wMIC Service Specific Software

- *Linux Operating System:* webMethods Integration Cloud server instances are running Linux Operating Systems CentOS distribution.
- *webMethods Integration Server:* webMethods Integration Server is a run-time server that provides built-in services. The Integration Server provides a platform to develop, deploy, and execute services or integrations from webMethods Integration Cloud.

- *webMethods CloudStreams*: CloudStreams is a multi-component product that enables customers to develop and govern integration flows between software as a service (SaaS) providers such as Salesforce.com and on-premise applications such as CRM and ERP.
- *Universal Messaging*: Universal Messaging is fast, reliable, scalable, and flexible Java message-oriented middleware (MOM) that provides messaging functionality. Universal Messaging serves as the intermediary that routes data from webMethods Integration Cloud to on-premise and vice versa.
- *Agileapps Platform*: The Agileapps Platform is a database (MySQL) in the cloud that doubles as a PaaS (Platform as a Service). This enables customers to get a high-powered database including a suite of pre-built application templates, so customers can run, customize, and build enterprise apps "in the cloud," applications that are driven by workflow processes and data policies and that support collaboration.
- *Memcached*: Memcached is a third-party caching mechanism used by the platform to cache the Application Data and other required elements, which improves performance by minimizing the user response time to the server.
- *MySQL Database*: The product is running MySQL databases within the EC2 RDS with Multi-AZ support for high availability.
- *Prometheus*: Prometheus is used for performance, and availability monitoring of customer's Cloud Service components and resources.
- *Splunk*: Splunk is used for log management and analysis of customer's Cloud infrastructure components and resources.
- *OpsGenie*: OpsGenie is used for the on-call alert notifications that are generated out of Splunk or Prometheus.
- *Statuspage* (in preview): Currently, Statuspage is a 3rd party service used in preview to notify any planned/unplanned downtimes to the customers.

vMIC Cloud Procedures

Onboarding Customers

After a webMethods Integration Cloud opportunity is successfully closed, the Direct Sales team provides the customer contract to the Contract Admins. Then a Contract Admin creates a new contract in SAP and provides the contract information and customer license files to the Logistics team and CSO team. Customers are also provided with the counter-signed Cloud Services Agreement (also known as the Master Service Agreement) which includes a security and availability exhibit, the SLAs, and product specifications for their reference.

Logistics sends an initial welcome e-mail to customers containing the link to register a tenant on the webMethods platform in the region selected. Customers are responsible for creating their initial tenant and returning the name of their sub-domain back to Software AG. Once the tenant is created, customers receive an automated e-mail. This e-mail contains all the necessary information to access the webMethods Integration Cloud tenant.

The Logistics team provides the selected sub-domain tenant name to the CSO team. The CSO team checks the registration data of customers and forwards the confirmed installation details to the R&D team using an iTrac (Jira) ticket. webMethods R&D determined the features and software capabilities based on the contracted licensed details then give setup instructions to CSO for the parameter changes and/or additional tenant architecture provisioning.

Service Level Reporting

As specified in the cloud contract service attachment service availability is 99.5%. Customers can subscribe for availability notifications on the Software AG Cloud trust site <https://trust.softwareag.com/integrationcloud/status/>

wMIC Data

wMIC Specific Data Backup and Recovery Management

The complete webMethods Integration Cloud system is backed up on a daily basis. The automated backup is of two data sources, the master database in the database management system and the GIT document repository. These objects contain all data from webMethods Integration Cloud customers. This backup is intended to help ensure that the entire system can be recovered. Backup data is stored in daily increments for seven days, then weekly increments for 4 weeks, and lastly monthly increments for six months.

If a disaster destroys the infrastructure, a new installation of webMethods Software can be installed on top of a newly built AWS environment. Once the new installation of webMethods Integration Cloud is complete, customer data can be recovered from backups of the GIT repository and MySQL database.

As specified in the cloud contract service attachment the system provides a Recovery Point Objective of 24 hours and a Recovery Time Objective of 12 hours.

webMethods API Cloud

Software AG's webMethods API Cloud is an API Management-as-a-Service platform that makes it easy to securely manage and expose APIs to your developer and partner community. The platform includes webMethods API Cloud Portal and webMethods API Cloud Gateway.

Components Relevant to the API Cloud Platform

API Gateway

When you expose your APIs to the world, security is your top priority. API Cloud's gateway protects you from unauthorized and malicious users, while also giving you full control and visibility over who's accessing your APIs.

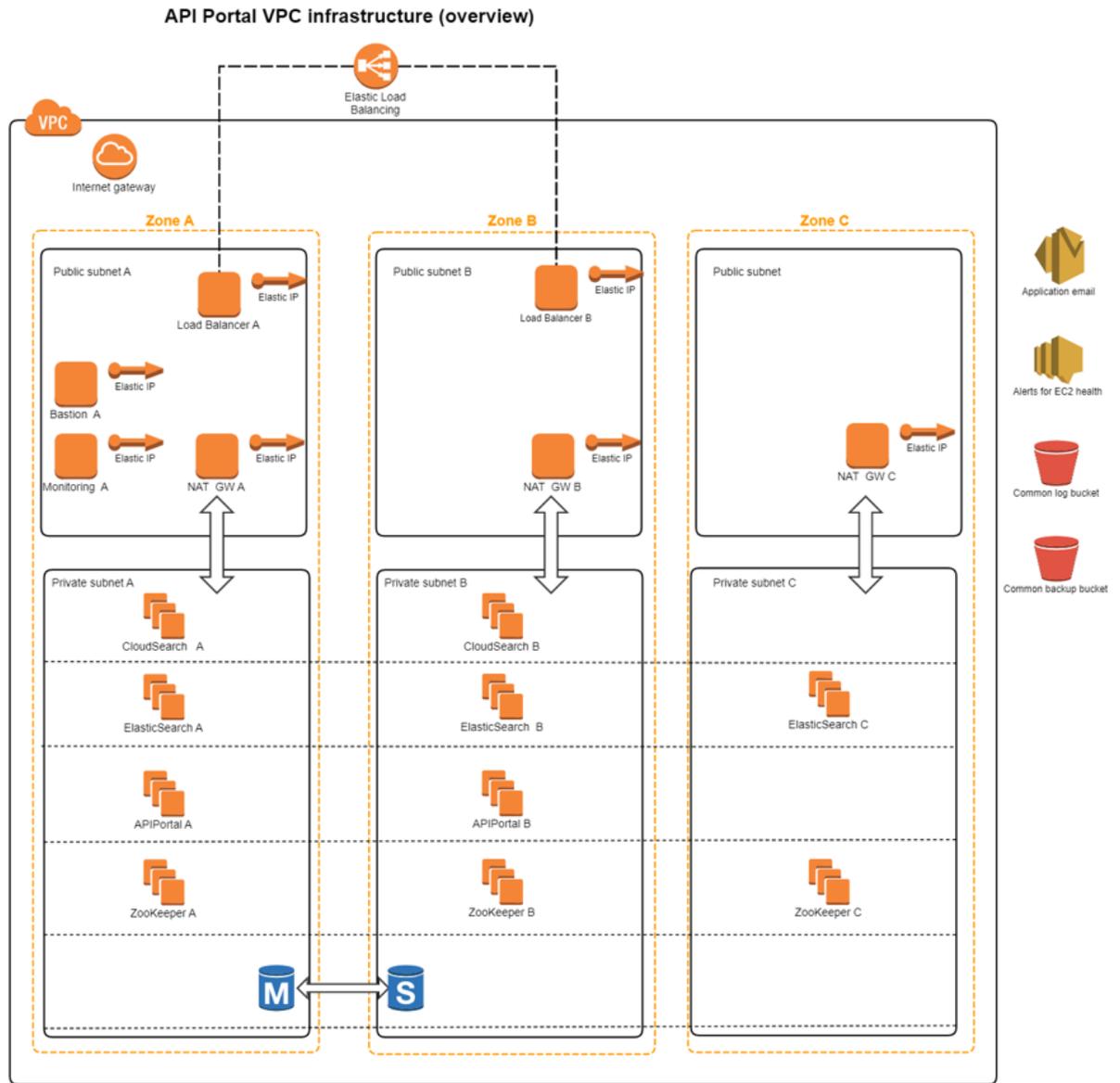
API Gateway can handle DDOS attacks at application level and configuration for this is completely in customer's control.

API Gateway Cloud is a collection of many components. Except very few common components like load balancer, the resources are dedicated because being a runtime, load from one customer might influence performance of the other. Customer can select between several different geographical regions for hosting their tenant depending on best connectivity.

APIGW Components

- APIGW instance
 - Tomcat - a webserver to server the API Gateway UI where the APIs are designed and managed.
 - Runtime Engine - the underlying core application of API GW that enables the product as described in the overview.
- Elasticsearch datastore - this is a NoSQL datastore that is used for storing API data which includes API details, policies and analytical data.
- Kibana - this is used for analytical data visualization.
- Terracotta - In-memory datastore used for clustering.
- Common Elasticsearch - This is for metering the API consumption and shared by all customers.
- Common nginx load-balancer: Dispatches the requests to customer specific instances and manages the SSL offloading and manages custom domain.

API Portal Logical Deployment Architecture



API Gateway and Portal Cloud Service Specific Software

- **Linux Operating System:** API Cloud server instances are running Linux Operating system
- **CAS, Prometheus and Splunk:** CAS, Prometheus, and Splunk tools are used for performance, and availability monitoring of customer's Cloud Service components and resources.
- **CLS:** CLS is used for log management and analysis of customer's Cloud infrastructure components and resources.
- **Statuspage:** Statuspage is used for report availability monitoring of customer's Cloud Service components and resources. See <https://webmethods.statuspage.io/>
- **OpsGenie:** OpsGenie to communicate and track alerts about customer's Cloud infrastructure components and resources health. See <https://softwareag.app.eu.opsgenie.com/>

API Cloud Procedures

Customer Onboarding

After an API Cloud opportunity is successfully closed, the Direct Sales team provides the customer contract to the Contract Admins. Then a Contract Admin creates a new contract in SAP and provides the contract information and customer license files to the Logistics team and CSO team. At this point, customers are also provided the counter-signed Cloud Services Agreement (also known as the Master Service Agreement) which includes a security and availability exhibit, the SLAs, and product specifications for their reference.

API Gateway Onboarding

For API Gateway customers, Cloud Ops receives a ticket and executes the deployment for the new tenant. The customer receives an automated confirmation e-mail on completion which includes their access credentials.

API Portal Onboarding

The deployment process for API Gateway provisions API Portal for a new tenant if this is part of the request.

Service Level Reporting

As specified in the cloud contract, service attachment service availability is 99.5%. For API Cloud, the customer can subscribe for notifications on the Software AG Cloud trust site <https://trust.softwareag.com/>

API Cloud Data

API Data Backup and Recovery Management

API Cloud Customers expect that support services are available at all times to safeguard the continuity of their business systems. To help ensure full support of API Cloud Products, a Business Continuity and Disaster Recovery (BC/DR) policy for Software AG Global Support (and supporting functions) according to ISO 23001 standards has been enacted.

Like any other cloud platform, API Cloud Products are exposed to potential risks that could disrupt business functions. The strategy for continuing business in the event of a major incident is to help ensure the safety and security of employees; and to continue business functions and services from predefined alternative sites or restore business functions within the agreed upon Service Level Agreement (SLA), Recovery Time Objective (RTO), and Recovery Point Objective (RPO). As specified in the cloud contract service attachment the system provides a RPO of 24 hours and a RTO of 12 hours.

The BC/DR plan is tested and reviewed annually.

For Cloud products, an automated backup process is established, tested and reviewed periodically. A backup of the API Cloud tenant is executed daily and contains all of the API customers' data. Backups can be restored in case of disaster as defined in the Master Service Agreement.

For Business Continuity, API Cloud servers are mirrored in different AWS Availability zones within the defined Region. API Cloud installations are also redundant across different availability zones for failover.

webMethods API Cloud on Microsoft Azure

Software AG's webMethods API Cloud is an API Management-as-a-Service platform that makes it easy to securely manage and expose APIs to your developer and partner community. The platform includes webMethods API Cloud Portal and webMethods API Cloud Gateway.

Components Relevant to the API Cloud Platform

API Gateway

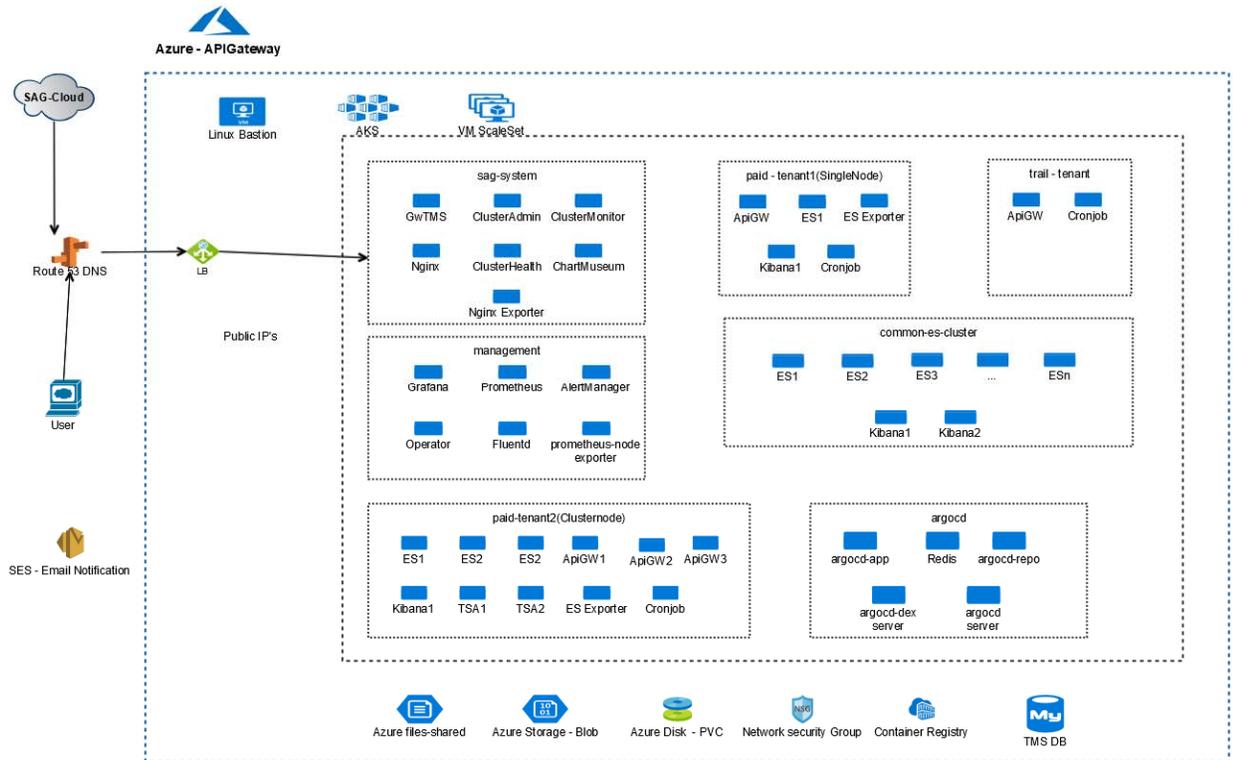
When you expose your APIs to the world, security is your top priority. API Cloud's gateway protects you from unauthorized and malicious users, while also giving you full control and visibility over who's accessing your APIs. API Gateway can handle DDOS attacks at application level and configuration for this is completely in customer's control.

API Gateway Cloud is a collection of many components. Except very few common components like load balancer, the resources are dedicated because being a runtime, load from one customer might influence performance of the other. Customer can select between several different geographical regions for hosting their tenant depending on best connectivity.

APIGW Components

- APIGW pod
 - Tomcat - a webserver to server the API Gateway UI where the APIs are designed and managed.
 - Runtime Engine - the underlying core application of API GW that enables the product as described in the overview.
- Elasticsearch datastore - this is a NoSQL datastore that is used for storing API data which includes API details, policies and analytical data.
- Kibana - this is used for analytical data visualization.
- Terracotta - In-memory datastore used for clustering.
- Common Elasticsearch - This is for metering the API consumption and shared by all customers.
- Load-balancer: Dispatches the requests to customer specific pods and manages the SSL offloading and manages custom domain.

API Gateway Logical Deployment Architecture



API Portal

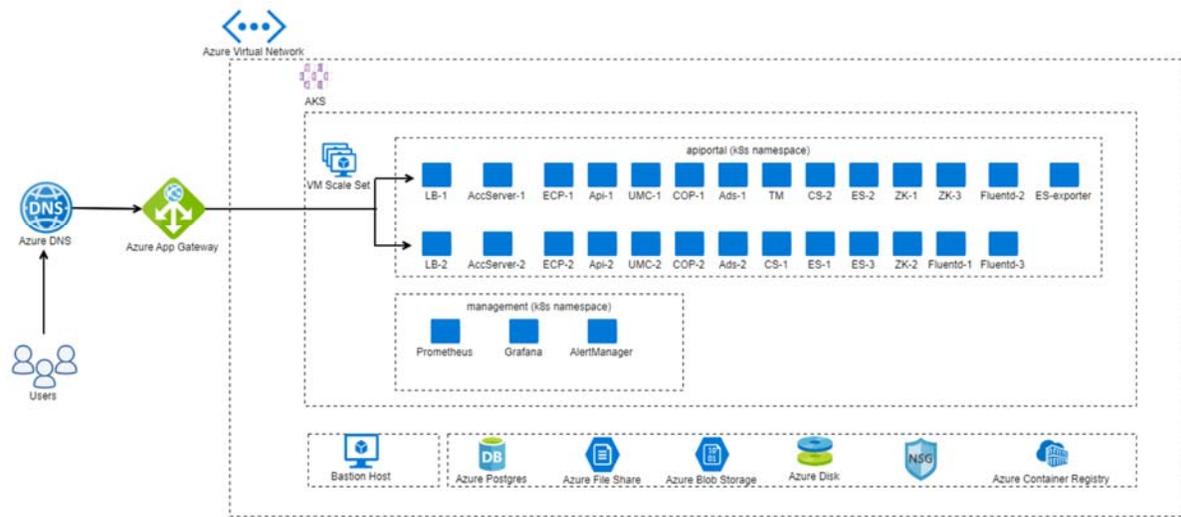
This is the place where developers discover and try your APIs. The developer portal is the public face of your API offerings and enables you to create and grow your ecosystem.

API portal is multi-tenant where customers share resources in a Virtual Private Cloud. Customer can select between several different geographical regions for hosting their tenant depending on best connectivity.

API Portal Components

- CloudSearch pod - queries Elasticsearch datastore via API calls, Elasticsearch described below.
- API Portal pod - hosts the User Interface, the web UI of the product.
- Azure postgres database - Stores API details and collaboration data.
- Elasticsearch pod - this is a NoSQL datastore that is used for storing user management data which includes users, groups, roles and supported authentication schemes etc. and both web and API analytical data.
- ZooKeeper pod - used for internal service discovery through the load balancer, part of solution architecture.
- Load Balancer pod - an internal load balancer that queries ZooKeeper for service routing, part of solution architecture.

API Portal Logical Deployment Architecture



- *Kubernetes environment*: API Cloud servers are running in pods on Azure Kubernetes environment.
- *Statuspage*: Statuspage is used for report availability monitoring of customer's Cloud Service components and resources. See <https://webmethods.statuspage.io/>
- *OpsGenie*: OpsGenie to communicate and track alerts about customer's Cloud infrastructure components and resources health. See <https://softwareag.app.eu.opsgenie.com/>
- *CAS, Prometheus and Splunk*: Prometheus is used for performance, and availability monitoring of customer's Cloud Service components and resources.
- *CLS*: CLS is used for log management and analysis of customer's Cloud infrastructure components and resources.

API Cloud Procedures

Customer Onboarding

After an API Cloud opportunity is successfully closed, the Direct Sales team provides the customer contract to the Contract Admins. Then a Contract Admin creates a new contract in SAP and provides the contract information and customer license files to the Logistics team and CSO team. At this point, customers are also provided the counter-signed Cloud Services Agreement (also known as the Master Service Agreement) which includes a security and availability exhibit, the SLAs, and product specifications for their reference.

API Gateway Onboarding

For API Gateway customers, Cloud Ops receives a ticket and executes the deployment for the new tenant. The customer receives an automated confirmation e-mail on completion which includes their access credentials.

API Portal Onboarding

For API Portal customers, Cloud Ops receives a ticket and executes the deployment for the new tenant. The customer receives an automated confirmation e-mail on completion which includes their access credentials.

Service Level Reporting

As specified in the cloud contract service attachment service availability is 99.5%. For API Cloud, the customer can subscribe for notifications on the Software AG Cloud trust site <https://trust.softwareag.com/>.

API Cloud Data

API Data Backup and Recovery Management

API Cloud Customers expect that support services are available at all times to safeguard the continuity of their business systems. To ensure full support of API Cloud Products, a Business Continuity and Disaster Recovery (BC/DR) policy for Software AG Global Support (and supporting functions) according to ISO 23001 standards has been enacted.

Like any other cloud platform, API Cloud Products are exposed to potential risks that could disrupt business functions. The strategy for continuing business in the event of a major incident is to ensure the safety and security of employees; and to continue business functions and services from predefined alternative sites or restore business functions within the agreed upon SLA, RTO, and RPO. As specified in the cloud contract service attachment the system provides a Recovery Point Objective of 24 hours and a Recovery Time Objective of 12 hours.

The BC/DR plan is tested and reviewed annually.

For Cloud products, an automated backup process is established, tested and reviewed periodically. A backup of the API Cloud tenant is executed daily and contains all of the API customers' data. Backups can be restored in case of disaster as defined in the Master Service Agreement.

For Business Continuity, API Cloud servers are mirrored in different Azure Availability zones within the defined Region. API Cloud installations are also redundant across different availability zones for failover.

webMethods.io B2B Cloud

webMethods.io B2B is a consumption based B2B document translation and transmission service that makes it easy to set up and communicate flexibly and reliably with trading partners. As a pure Software-as-a-Service (SaaS) offering it enables the customer to reduce costly and time-consuming hardware and infrastructure investments, implementation, and operations.

webMethods.io B2B includes the following key benefits:

- Pay as you grow
- Low TCO, no operational headaches
- Fast setup and partner on-boarding
- Real-time-electronic document exchange through XML and EDI (UNEDIFACT, ANSI X12, EANCOM, ODETTE, UCS, VICS, VDA, TRADACOMS)
- Utilize AS2 and HTTP transport protocols
- Secure transmission and translation for Advanced Shipping
- Notices (ASN), invoices, purchase orders, proof-of-delivery, quotes, and more
- Greater control with end-to-end visibility of your partner network

- Peace of mind—count on the reliable connectivity of webMethods, the industry-leading hybrid integration platform
- Integrate with webMethods.io Integration for orchestration using predefined applications
- Monitor all transactions passing through webMethods.io B2B

Core Features

- *Customize document types:* Use webMethods.io B2B to quickly customize document types for support of priority partners who create their own versions of document standards.
- *Document creation, parsing & validation:* Out-of-the-box support for XML and EDI, covering hundreds of versions and 15000+ transaction definitions, including ANSI X12, EDIFACT, VICS, EANCOM, ODETTE, VDA, and TRADACOM. Document validation helps you assure data accuracy and high quality. Ensure the data you send and receive is correct and reliable and that your documents are delivered and received securely with your trading partners.
- *Reusable rules:* Reduce errors and inefficiencies by implementing consistent and reusable document processing rules. Processing rules provide flexibility in your partner communications and helps ensure consistent and reliable data.
- *Back-end integration:* Quickly tie your B2B processes to your back-end systems and orchestrate your B2B processes via webMethods.io Integration
- *Security and encryption:* webMethods.io B2B ensures transaction security through partner certificates plus SSL support for Inbound and Outbound Channels, including AS2. Automatic encryption/decryption adds an additional layer of assurance.
- *Real-time exchange:* With webMethods.io B2B you can work in real-time with your trading partners, eliminating costly delays and speeding up the way you do business.
- *Operational visibility:* Track and manage B2B transactions. Gain complete end-to-end visibility into B2B transactions across your entire trading network. Instantly see the status of your transactions.
- *Message repair & resubmit:* When a transaction problem happens, fix it fast. With webMethods.io B2B, you can locate the problem's source by drilling down into transaction data, including message header and routing information as well as the message payload itself. Then, take corrective or preventive action as needed. You can easily update the transaction payload and resubmit. This saves you from having to wait on your partners to fix an issue on their side and then resend the message.
- *Activity logs:* You need a record of the information that flows through your B2B gateway whether it is for the daily management of your business or to support security or compliance initiatives. With webMethods.io B2B, you can capture all of your message transaction data in a centralized audit log and access the log easily anytime.

Components Relevant to webMethods.io B2B Cloud System

webMethods.io B2B is deployed using IaaS provider services where customers share central resources but are virtually segregated. The webMethods.io B2B platform is currently available in three regions – AWS US and DE and Azure Australia East. Customers can host their tenants in order to meet their business needs.

webMethods.io B2B is a multi-instance single-tenant architecture. All tenants share the same cloud infrastructure where all data and business logic is physically isolated per tenant; Tenants cannot disrupt each other as they do not share computing resources. The elastically scalable architecture ensures that resources can be switched on and off during runtime in order to adapt capacity to your actual needs. Intelligent routing routes requests from users and SaaS applications to the correct tenant-specific computing resources.

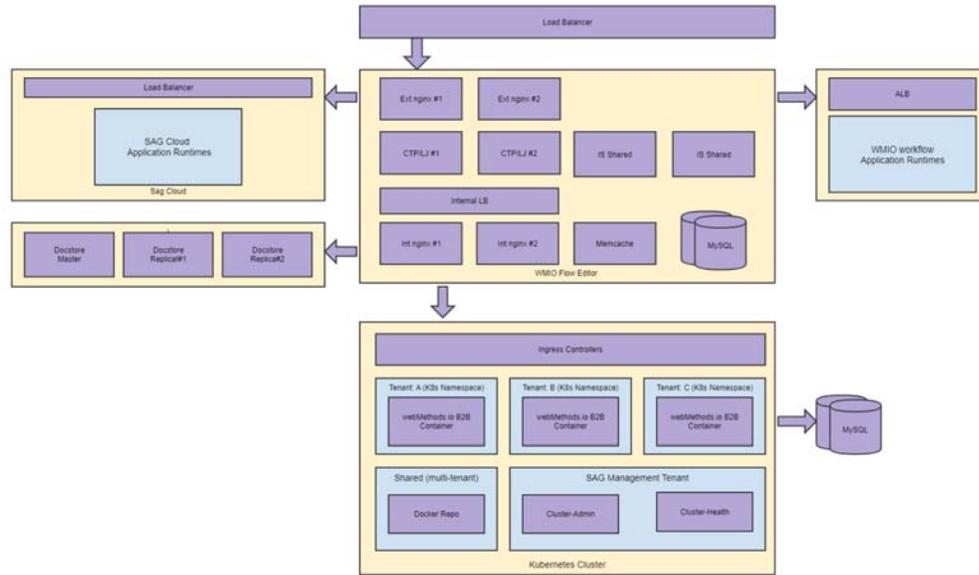
- *webMethods.io B2B UI:* All requests to create, manage and execute workflows on the webMethods.io B2B platform are handled by the UI client. Based on the request type, the user interface then forwards the relevant data to tenant-specific computing resources.

Software AG Cloud

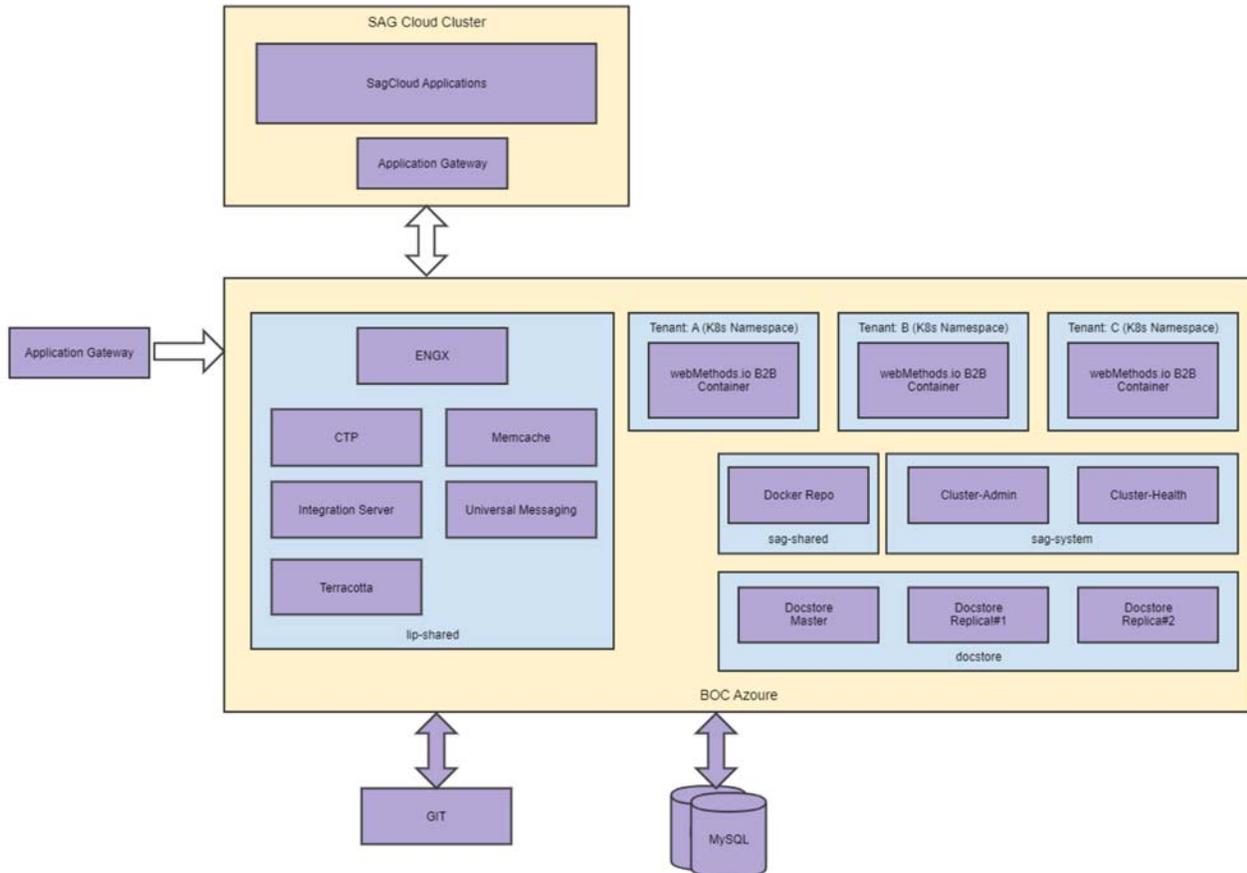
SOC 3[®] Report - SOC for Service Organizations: Trust Services Criteria for General Use
webMethods Cloud System

- *webMethods.io B2B Server*: webMethods.io B2B is a run-time server that provides built-in services. The customer-specific transactions are executed in an isolated container running on Kubernetes technology.

webMethods.io B2B Cloud Logical Deployment Architecture in AWS



webMethods.io B2B Cloud Logical Deployment Architecture in Azure



webMethods.io B2B Service Specific Software

- *Linux Operating System:* webMethods.io B2B server instances are running on Linux Operating Systems CentOS distribution.
- *ALB:* AWS Load balancer
- *Nginx:* Nginx Server
- *webMethods B2B Runtime:* webMethods B2B is a run-time server that provides built-in services. It automates B2B transactions, enables accurate, real-time exchange of information with customers, distributors, manufacturers, suppliers, and other partners.
- *Cluster-Admin:* All the requests to create, update and delete operations for the webMethods.io B2B container on the Kubernetes platform are handled by cluster-admin. Based on the customers' request type, the operations are conducted for tenant-specific computing resources.
- *AgileApps Platform:* The AgileApps Platform is a database (MySQL) in the cloud that doubles as a PaaS (Platform as a Service). This enables customers to get a high-powered database including a suite of pre-built application templates, so customers can run, customize, and build enterprise apps "in the cloud," applications that are driven by workflow processes and data policies and that support collaboration.
- *Memcached:* Memcached is a third-party caching mechanism used by the platform to cache the Application Data and other required elements, which improves performance by minimizing the user response time to the server.
- *Docstore:* The Docstore is a document standards repository based on the Mongo database. It currently hosts the EDI document standards like ANSI X12, EDIFACT, VICS, EANCOM, ODETTE, VDA, and TRADACOMS.
- *MySQL Database:* The product is running MySQL databases within the EC2 RDS with Multi-AZ support for high availability.
- *Kubernetes:* (Deployed in AWS) It is an open-source platform for managing containerized workloads and services, that facilitates both declarative configuration and automation. See <https://kubernetes.io>
- *AKS:* (Deployed in Azure) It is a Kubernetes managed service by Azure for managing containerized workloads and services, that facilitates both declarative configuration and automation. See <https://docs.microsoft.com/en-us/azure/aks/>
- *Prometheus and Grafana:* These are third-party open-source applications used for system, applications monitoring, alerting and dashboard requirements.
- *Grafana:* The open observability platform | Grafana Labs
- *OpsGenie:* This is a cloud-based managed service used for support management. It is well integrated with Prometheus and Alertmanager to route the alerts based on the severity for 24/7 on-call support members.

webMethods.io B2B Cloud Procedures

Customer Onboarding

After a webMethods.io B2B opportunity is successfully closed, the Direct Sales team provides the customer contract to the Contract Admins. Then a Contract Admin creates a new contract in SAP and provides the contact information and customer license files to the Logistics team, CSM, and CSO team. Customers are also provided with the counter-signed Cloud Services Agreement (also known as the Master Service Agreement) which includes a security and availability exhibit, the SLAs, and product specifications for their reference.

Logistics sends an initial welcome e-mail to customers containing the link to register a tenant on the webMethods.io B2B platform in the region selected. Customers are responsible for creating their initial tenant and returning the name of their sub-domain back to Software AG. Once the tenant is created, customers receive an automated e-mail. This e-mail contains all the necessary information to access the webMethods.io B2B tenant.

The Logistics team provides the selected sub-domain tenant name to the CSM team. The CSM team checks the registration data of customers and provisions the Customer tenant as per the agreement.

Service Level Reporting

As specified in the cloud contract service attachment, service availability is 99.9%. Customers can subscribe for availability notifications on the Software AG Cloud trust site <https://trust.softwareag.com/webmio/status/>

webMethods.io B2B Data

webMethods.io B2B Data Backup and Recovery Management

The complete webMethods.io B2B system is backed up on daily basis. The automated backup is one data source that includes AWS RDS. These objects contain all data from webMethods.io B2B customers. Following are the backup policies for the mentioned data sources, AWS RDS - Automated daily snapshot backup with a retention period of 30 days.

This backup is intended to ensure that the entire system can be recovered. If a disaster causes the tear down of the existing infrastructure, a fresh installation of webMethods.io B2B can be configured with a new AWS environment. Post completion of webMethods.io installation, customer data can be recovered from the above-mentioned backups.

As specified in the cloud contract service attachment, the system provides a Recovery Point Objective of 24 hours and a Recovery Time Objective of 12 hours.

webMethods Cloud Container

webMethods Cloud Container offers the ability to use Software AG Designer, the full-featured professional development environment, to deploy packages and configurations that reside within on-premises runtimes or repositories to webMethods Cloud.

Choose from predefined cloud solution landscapes, let Software AG handle landscape provisioning, deploy the packages and configurations, manage fixes, patches and upgrades, and provide CI/CD support in the cloud. Then explore out-of-the-box monitoring dashboards to track solution health as well as alerts.

Core Features

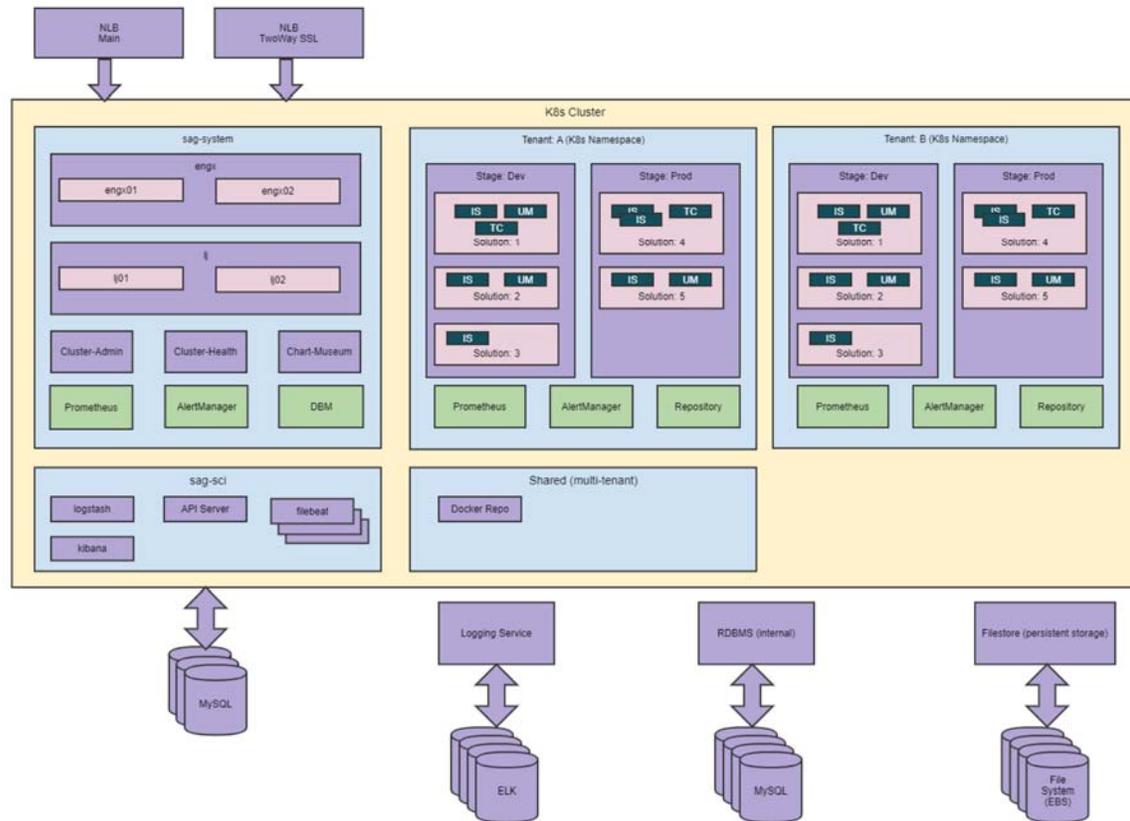
- *Create and Manage Your Own Solutions:* A Solution is a logical combination of webMethods Integration Server packages, Adapter packages, Services, webMethods CloudStreams packages, and webMethods Integration Server and Universal Messaging configuration assets or configurations.
- *Support Assets Debugging:* Use webMethods Cloud Container to quickly customize document types for support of priority partners who create their own versions of document standards.
- *Monitoring and Alerts:* The Monitoring part of webMethods Cloud Container enables you to monitor the health and availability of the solutions and run-time instances, alerts and alert statuses. You receive an email whenever there is a condition that might affect the solution.
- *Database as a Service:* Add a MySQL database to your Cloud Container subscription. This enables you to configure, store, and monitor your database directly in the cloud. The database endpoint can be shared by multiple solutions deployed by the tenant.

Components Relevant to webMethods Cloud Container Cloud System

webMethods Cloud Container is deployed using IaaS provider services where customers share central resources but are virtually segregated. The webMethods Cloud Container platform is currently available in three regions – United States, Europe Ireland and Germany. Customers can host their tenant in order to meet their business needs. webMethods Cloud Container is a multi-instance single tenant architecture. All tenants share the same cloud infrastructure where all data and business logic is physically isolated per tenant; Tenants cannot disrupt each other as they do not share computing resources. The elastic scalable architecture ensures that resources can be switched on and off during runtime in order to adapt capacity to your actual needs. Intelligent routing routes requests from users and SaaS applications to the correct tenant specific computing resources.

- *webMethods Cloud Container UI Client:* All requests to create, manage, and execute workflows on webMethods Cloud Container platform are handled by the UI client. Based on the request type, the user interface then forwards the relevant data to the runtime.
- *webMethods Integration Server:* webMethods Integration Server is a run-time server that provides built-in services. The customer specific transactions are executed in an isolated container running on Kubernetes technology.
- *Software AG Universal Messaging Server:* Software AG Universal Messaging Server is used to deliver high throughput messaging for resilient, secure and highly scalable applications.

webMethods Cloud Container Cloud Logical Deployment Architecture



webMethods Cloud Container Service Specific Software

- *Linux Operating System:* webMethods Cloud Container server instances are running on Linux Operating Systems CentOS distribution.
- *NLB:* AWS Load balancer
- *Nginx:* Nginx Server for traffic routing
- *webMethods CTP:* All requests to create, manage, and execute workflows on webMethods Cloud Container platform are handled by the UI client.
- *webMethods Integration Server:* webMethods Integration Server is a run-time server that provides built-in services.
- *Software AG Universal Messaging Server:* Universal Messaging is fast, reliable, scalable, and flexible Java message-oriented middleware (MOM) that provides messaging functionality. Universal Messaging serves as the intermediary that routes data from webMethods Integration Cloud to on-premise and vice versa.
- *Software AG Terracotta Server:* For In memory data storage for Integration Server stateful cluster services.
- *Cluster-Admin:* All the requests to create, update and delete operations for webMethods Cloud Container on Kubernetes platform are handled by cluster-admin. Based on the customer's request type, the operations are conducted for tenant specific computing resources.
- *AgileApps Platform:* The AgileApps Platform is a database (MySQL) in the cloud that doubles as a PaaS (Platform as a Service). This enables customers to get a high-powered database including a suite of pre-built application templates, so customers can run, customize, and build enterprise apps "in the cloud"-- applications that are driven by workflow processes and data policies and that support collaboration.
- *Amazon Elasticsearch Search Service:* It is a fully managed service that makes it easy for you to deploy, secure, and run Elasticsearch cost effectively at scale. It is used to store the logs. For more details: <https://aws.amazon.com/elasticsearch-service/>
- *Filebeat, Logstash and Kibana:* These are open-source applications used as below Filebeat ships the application logs to Logstash. Logstash is a powerful ingest pipeline to process the incoming logs and store it in Amazon Elastic Search Service, Kibana is a flexible visualization tool to query the logs.
- *Memcached:* Memcached is a third-party caching mechanism used by the platform to cache the Application Data and other required elements, which improves performance by minimizing the user response time to the server.
- *MySQL Database:* The product is running MySQL databases within the RDS with Multi-AZ support for high availability. For more details: <https://aws.amazon.com/rds/mysql/>
- *Amazon S3:* Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance. It is used to store daily backups of the environment. For more details about AWS S3: <https://aws.amazon.com/s3/>
- *Kubernetes:* It is an open-source platform for managing containerized workloads and services, that facilitates both declarative configuration and automation.
- *Prometheus and Grafana:* These are third-party open-source applications used for system, applications monitoring, alerting and dashboard requirements.
- *Ops-Genie:* This is a cloud based managed service used for support management. It is well integrated with Prometheus and Alertmanager to route the alerts based on the severity for 24/7 on-call support members.

webMethods Cloud Container Cloud Procedures

Customer Onboarding

After a webMethods Cloud Container opportunity is successfully closed, the Direct Sales team provides the customer contract to the Contract Admins. Then a Contract Admin creates a new contract in SAP and provides the contract information and customer license files to the Logistics team, CSM and CSO team. Customers are also provided with the counter-signed Cloud Services Agreement (also known as the Master Service Agreement) which includes a security and availability exhibit, the SLAs, and product specifications for their reference.

Logistics sends an initial welcome e-mail to customers containing the link to register a tenant on the webMethods Cloud Container platform in the region selected. Customers are responsible for creating their initial tenant and returning the name of their sub-domain back to Software AG. Once the tenant is created, customers receive an automated e-mail. This e-mail contains all necessary information to access the webMethods.io B2B tenant.

The Logistics team provides the selected sub-domain tenant name to CSM team. CSM team checks the registration data of customers and provisions the Customer tenant as per the agreement.

Service Level Reporting

As specified in the cloud contract service attachment service availability is 99.9%. Customers can subscribe for availability notifications on the Software AG Cloud trust site
<https://trust.softwareag.com/cloudcontainer/status/>

webMethods Cloud Container Data Backup and Recovery Management

The complete webMethods Cloud Container system is backed up on daily basis. The automated backup is of three data sources which include the AWS RDS, Git repository and ETCD. These objects contains all data from webMethods Cloud Container customers. Following are the backup policies for mentioned data sources:

- AWS RDS - Automated daily snapshot backup with retention period of 30 days
- AWS EBS - Automated daily snapshot backup with retention period of 30 days
- ETCD - Automated daily backup with retention period of 30days

This backup is intended to ensure that the entire system can be recovered. If a disaster causes a tear down of the existing infrastructure, a fresh installation of webMethods Cloud Container can be configured with new AWS environment. Post completion of webMethods Cloud Container installation, customer data can be recovered from above mentioned backups.

As specified in the cloud contract service attachment the system provides a Recovery Point Objective of 24 hours and a Recovery Time Objective of 12 hours.

webMethods.io Integration and webMethods.io Embed

webMethods.io Integration is Software AG's Integration Platform as a Service (iPaaS) offering which provides a combination of capabilities offered by ESBs, data integration systems, API management tools, and B2B gateways. It empowers organizations to easily integrate devices, on-premise systems, and Software-as-a-Service (SaaS) applications such as Salesforce and ServiceNow. With its robust and secure architecture coupled with a wide range of features, it helps enterprises boost agility and enhance their business process efficiency.

Here are the core features of webMethods.io Integration:

- Smart, an intuitive user interface for creating complex integrations quickly and easily
- Sophisticated orchestration ensures that all integrations can be created, managed and monitored through a central location easily
- Seamless and secure integration of on-premise systems, devices, and over 250 SaaS applications

- In-house applications to facilitate file transfer, data mapping, and data transformation
- Support for creating custom applications that suit specific integration requirements
- A vast library of ready-to-use integrations which can be customized further based on business needs
- Multi-tenant architecture that caters to scaling requirements of all organizations, big and small
- Stages management support which enables to promote a project from the development-testing production stage
- End-to-end monitoring for finding and resolving performance issues faster

Core Features

- *User Interface:* webMethods.io Integration's user interface is built for developers as well as business users. The user interface supports wizards and embedded help links to guide users in the integration creation process.
- *Sophisticated Orchestration:* webMethods.io Integration offers sophisticated orchestration to rapidly develop agile applications which can be managed and monitored from a central location.
- *Wide Range of Supported Applications:* webMethods.io Integration provides out-of-the-box connectivity to SaaS applications such as Salesforce, ServiceNow, and Strikelron as well as industry-standard protocols such as REST, SOAP, and OData. Apart from this, in-house applications such as FTP/SFTP and Transform provide file transfer and data mapping and transformation capabilities. Additionally, webMethods.io Integration supports custom application development to allow the creation of tailor-made applications for specific integration needs.
- *Mapping and Transformation:* Connect multiple applications, map the data of one application with another, and transform the application data in a way that best suits your business requirements, all through a simple drag-and-drop interface that can be easily used by business users.
- *Stage Management:* webMethods.io Integration provides a default environment for each tenant. Tenant owners can register their other tenants as additional environments and use this multi-environment structure to manage their project development lifecycle. Tenant owners can create and configure integrations in one environment, and when ready, publish them to another environment for use. This segregates the development environment of your tenant from the production one, thereby eliminating any chances of outages usually caused while migrating data from development to production.
- *End-to-end Monitoring:* webMethods.io Integration allows you to have clear visibility into all of your webMethods.io systems with a dynamic view of your webMethods.io service calls as they move through various runtimes in API, B2B and Integration. Find performance issues faster with Root Cause Analysis, which enables you to drill down further into the runtime and pinpoint where the problems are.
- *webMethods.io Embed:* This provides an embedded integration engine to the webMethods.io Integration platform which is designed to enable users to easily connect and integrate data from a variety of systems, apps, and devices, from within their own applications.

Components Relevant to webMethods.io Integration Cloud System

- webMethods.io Integration is deployed using IaaS provider services where customers share central resources but are virtually segregated.
- The webMethods.io Integration platform is available in two regions for AWS – United States and Europe, and in three regions for Azure - Australia East, West Europe, East US. Customers can select the best region to host their tenants in order to meet their connectivity needs. Tenant resources are deployed across at least 2 data centers within a region active/active for High Availability.

- webMethods.io Integration is a multi-instance single-tenant architecture. All tenants share the same cloud infrastructure where all data and business logic is physically isolated per tenant; Tenants cannot disrupt each other as they do not share computing resources. The elastically scalable architecture ensures that resources can be switched on and off during runtime in order to adapt capacity to your actual needs. Intelligent routing routes requests from users and SaaS applications to the correct tenant-specific computing resources.
- *UI Client*: All requests to create, manage, and execute workflows on webMethods.io Integration platform are handled by the UI client. Based on the request type, the user interface then forwards the relevant data to the API server.
- *Trigger Server*: The trigger component raises events for initiating the workflow execution. When a trigger is defined in a workflow, it starts listening to that event, and when the event occurs, the workflow execution is initiated.
- *API Server*: API server forms the business layer of webMethods.io Integration. All the data required by clients is served by the API server. All requests, changes and events from UI clients are sent to the API server for processing. The majority of the business logic is written inside the API server.
- *QManager*: When a workflow execution request is sent by the API server, Trigger server, or Queue Manager, the Queue Manager adds these requests to the Apache Pulsar service and stores the workflow execution related metadata in the MongoDB server. When Exchange picks up a workflow execution request from the Apache Pulsar service for execution, it fetches the workflow execution metadata from the MongoDB server. It also handles workflow validation and rate limiting-related activities.
- *OAuth Server*: OAuth is the process of granting webMethods.io Integration the necessary permissions to access third-party applications on the user's behalf. The OAuth server handles this process by interacting with UI clients, third-party apps, and the MongoDB server.
- *Engine*: The engine is the core component of webMethods.io Integration that is responsible for executing the workflows. It is written in TypeScript and uses Node 8. A workflow execution request is sent to the engine either through QManager server or API server. Based on the request type, the relevant workflow execution mechanism is handled by the Engine.
- *Exchange*: Exchange is a lightweight processor which is responsible for sending jobs for execution from AWS SQS service to the Engine server and removing jobs from AWS SQS once the job execution is completed.
- *Lookup Server*: The Lookup server lets you populate the user's resources at runtime once the user provides a valid connection or authorization for a web service.
- *Connector*: The connector components is responsible for handling all triggers and actions available in webMethods.io Integration.

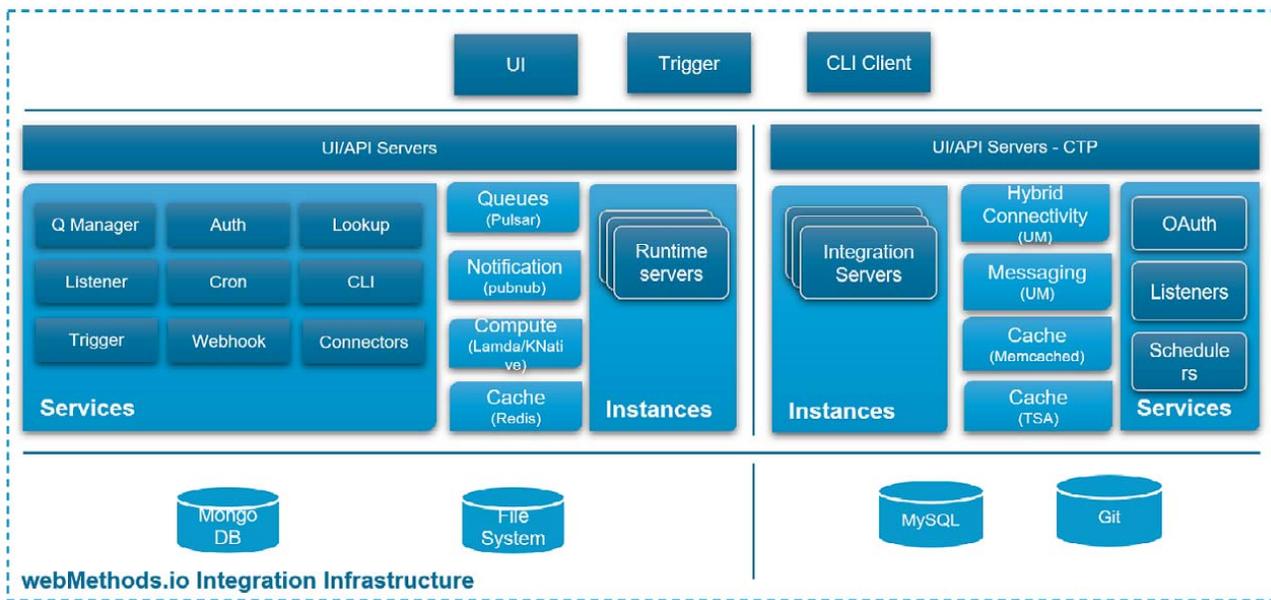
Components Relevant to webMethods.io Embed Cloud System

- webMethods Embed is deployed using IaaS provider services where customers share central resources but are virtually segregated.
- The webMethods.io Embed platform is available in two regions in AWS – United States and Europe. webMethods.io Embed is hosted on top of webMethods.io Integration and leverages the same infrastructure as that of webMethods.io Integration with some additional microservices specific to wM.io Embed. All tenants share the same cloud infrastructure where all data and business logic is physically isolated per tenant; Tenants cannot disrupt each other as they do not share computing resources. The elastic scalable architecture ensures that resources can be switched on and off during runtime in order to adapt capacity to your actual needs. Intelligent routing routes requests from users and SaaS applications to the correct tenant specific computing resources.
- All components of webMethods.io Integration are part of webMethods.io Embed

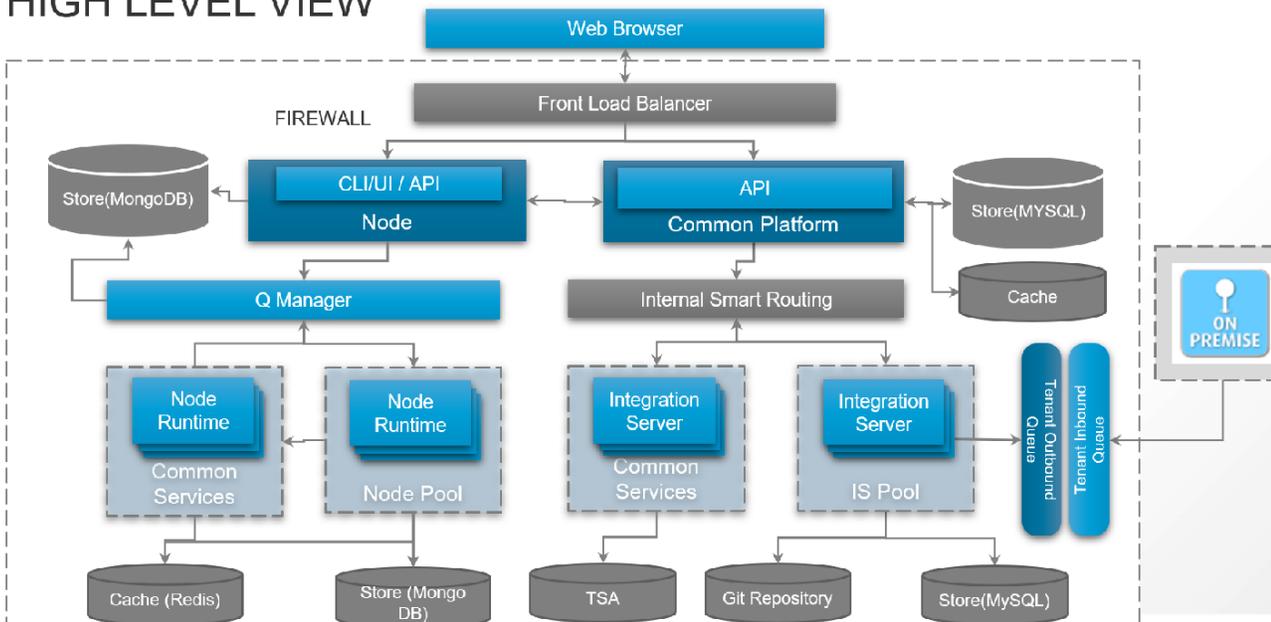
- Embed API/UI: Embed API service to communicate with the embedded applications and process further integrations.
- Embed bots: Embed bots service to handle traffic coming from the bot commands from different messaging tools where webMethods.io Embed is enabled.
- Embed SDK: Developers can utilize the Embed SDK to facilitate connectivity between their applications and webMethods.io Integration.
- Embed delayed jobs

webMethods.io Integration and webMethods.io Embed Logical Deployment Architecture (AWS)

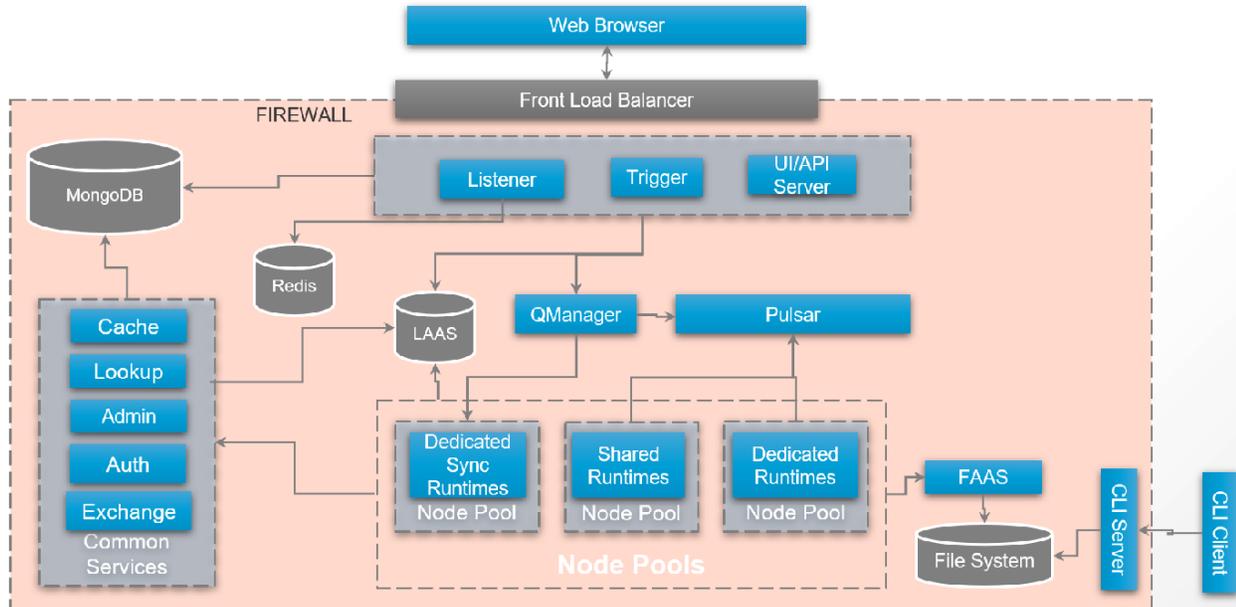
WMIO Component Diagram:



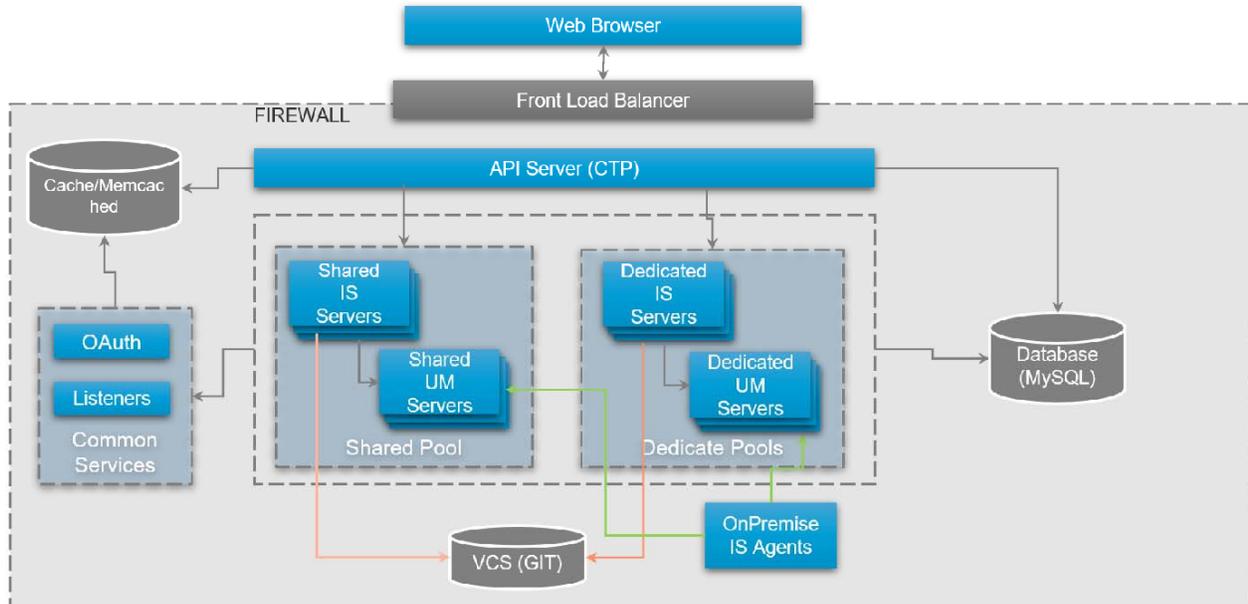
HIGH LEVEL VIEW



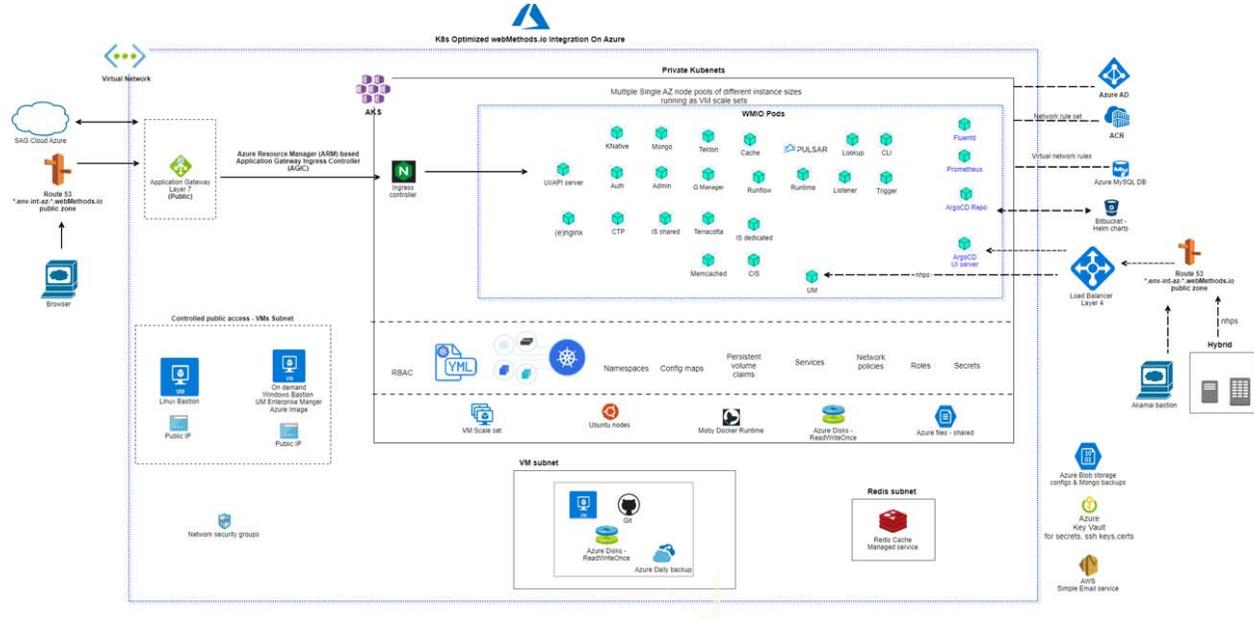
WEBMETHODS.IO INTEGRATION - WORKFLOWS



WEBMETHODS.IO INTEGRATION - FLOW



webMethods.io Integration Logical Deployment Architecture (Azure)



Components Short Description

- **ALB:** AWS Load balancer
- **Nginx:** Nginx Server
- **UI/API Server:** A web server to serve assets including HTML, CSS, JS as well as Management REST APIs to manage Users, Workflows, Roles etc.
- **QManager:** QManager aka Queue Manager accepts all workflow execution requests and validate against user's/tenant's plan and then push it into appropriate workflow queue.
- **Trigger:** Trigger server keep watches on all triggers created by users runtime on webmethods.io and create workflow execution request based on generated trigger events.
- **Listener:** Listener server is a part of trigger server. It mostly serve messaging kind of triggers where always on socket connection is required.
- **Cache:** Cache server is used to create cache of data saved inside database which is frequently used in webmethods.io
- **Lookup:** Lookup server provides lookup functionality to all connectors action where instead of filling correct value in a field manually, lookup server fetch data from user's account and show it in dropdown to select between them.
- **Runtime/Engine:** Runtime fetches workflow requests from queues and executes all workflows and store status of it in database.
- **Admin (internal):** Admin server used internally to create/update features, plans etc.
- **Auth:** Auth server handles all authorizations provided by users to execute various actions. Auth server keeps all authtokens alive and active and ready to use by webmethods.io Runtime.
- **CLI:** CLI client and server helps user create their own node.js based connector and deploy directly on to webmethods.io production account.
- **CTP:** CTP is an UI/API server of Integration cloud

- *IS*: Integration server behind Integration cloud
- *UM*: Universal messaging server
- *Knative*: Kubernetes-based platform to build, deploy, and manage modern serverless workloads

External Tools Used

- AWS
 - Amazon SQS: To execute workflows
 - Apache Pulsar: To execute workflows and sync execution
 - Amazon S3: To store CLI connector code and test action output
 - AWS Lambda: To execute CLI connectors
 - Amazon EFS: To store a copy of CLI connector code
- Azure
 - Apache Pulsar: To execute workflows and sync execution and audit logs to MongoDB
 - Blob Storage: To store CLI connector code and test action output
 - Knative: To execute CLI connectors
 - Azure File System (AFS): To store a copy of CLI connector code
 - Azure managed MySQL: To store Flow Editor user information into the database
 - Azure managed Redis: To store various frequently accessed objects for caching purpose

webMethods.io Integration Service Specific Software

- *Linux Operating System*: webMethods Integration Cloud server instances are running Linux Operating Systems CentOS distribution.
- *webMethods Integration Server*: webMethods Integration Server is a run-time server that provides built-in services. The Integration Server provides a platform to develop, deploy, and execute services or integrations from webMethods Integration Cloud.
- *webMethods CloudStreams*: CloudStreams is a multi-component product that enables customers to develop and govern integration flows between software as a service (SaaS) providers such as Salesforce.com and on-premise applications such as CRM and ERP.
- *Universal Messaging*: Universal Messaging is fast, reliable, scalable, and flexible Java message-oriented middleware (MOM) that provides messaging functionality. Universal Messaging serves as the intermediary that routes data from webMethods Integration Cloud to on-premise and vice versa.
- *Agileapps Platform*: The Agileapps Platform is a database (MySQL) in the cloud that doubles as a PaaS (Platform as a Service). This enables customers to get a high-powered database including a suite of pre-built application templates, so customers can run, customize, and build enterprise apps "in the cloud"-- applications that are driven by workflow processes and data policies and that support collaboration.
- *Memcached*: Memcached is a third-party caching mechanism used by the platform to cache the Application Data and other required elements, which improves performance by minimizing the user response time to the server.
- *MySQL Database*: The product is running MySQL databases within the EC2 RDS with Multi-AZ support for high availability.

webMethods.io Integration Cloud Procedures

Customer Onboarding

After a webMethods.io opportunity is successfully closed, the Direct Sales team provides the customer contract to the Contract Admins. Then a Contract Admin creates a new contract in SAP and provides the contract information and customer license files to the Logistics team, CSM and CSO team. Customers are also provided with the counter-signed Cloud Services Agreement (also known as the Master Service Agreement) which includes a security and availability exhibit, the SLAs, and product specifications for their reference.

Logistics sends an initial welcome e-mail to customers containing the link to register a tenant on the webMethods.io platform in the region selected. Customers are responsible for creating their initial tenant and returning the name of their sub-domain back to Software AG. Once the tenant is created, customers receive an automated email. This e-mail contains all the necessary information to access the webMethods.io tenant.

The Logistics team provides the selected sub-domain tenant name to CSM team. The CSM team checks the registration data of customers and provisions the Customer tenant as per the agreement.

Service Level Reporting

As specified in the cloud contract service attachment, service availability is 99.9%. Customers can subscribe for availability notifications on the Software AG Cloud trust site <https://trust.softwareag.com/integrationcloud/status/>.

webMethods.io Integration Data

webMethods.io Integration Data Backup and Recovery Management

AWS

The complete webMethods.io Integration system is backed up on daily basis. The automated backup is of three data sources which include the mongo database, AWS RDS, and git document repository. These objects contain all data from webMethods.io customers. Following are the backup policies for the mentioned data sources:

- Mongo DB - Automated daily backup with a point in time recovery via Mongo Cloud Manager along with automated daily backup to S3 with a retention period of 30 days.
- AWS RDS - Automated daily snapshot backup with a retention period of 30 days.
- Git Repository - Automated daily backup to S3 with a retention period of 30 days.

This backup is intended to ensure that the entire system can be recovered. If a disaster causes a tear down of the existing infrastructure, a fresh installation of webMethods.io can be configured with new AWS environment. Post completion of webMethods.io installation, customer data can be recovered from the above-mentioned backups.

Azure

The complete webMethods.io Integration system is backed up on daily basis. The automated backup is of three data sources which include the mongo database, Azure managed MySQL server, and git document repository. These objects contain all data from webMethods.io Integration customers. Following are the backup policies for the mentioned data sources:

- Mongo DB - Automated daily backup with a point in time recovery via Mongo Cloud Manager along with automated daily backup to blob storage with a retention period of 30 days.
- Azure managed MySQL instance - Configured with point-in-time restore capabilities.
- Git Repository - Automated daily backup to blob storage with a retention period of 30 days.

This backup is intended to ensure that the entire system can be recovered. If a disaster causes a tear down of the existing infrastructure, a fresh installation of webmethods.io can be configured with a new Azure environment. Post completion of webmethods.io Integration installation, customer data can be recovered from the abovementioned backups.

As specified in the cloud contract service attachment the system provides a Recovery Point Objective of 24 hours and a Recovery Time Objective of 12 hours.

D. Principal Service Commitments and System Requirements

Software AG Cloud designs its processes and procedures related to its webMethods Cloud System services to achieve the Company’s objectives. Those objectives are based on the service commitments that Software AG makes to user entities, the laws and regulations that govern the provision of the webMethods Cloud System, and the financial, operational, and HIPAA compliance requirements that Software AG Cloud has established for the services. Security commitments to user entities are documented and communicated in Service Level Agreements (SLAs) and other customer agreements, as well as in the description of the service offering provided online. Security and availability commitments are standardized and include, but are not limited to, the following:

- The use of the security principle that is designed to permit system users to access the information they need based on their role in the system while restricting them from accessing information not needed for their role;
- The use of encryption technologies to protect customer data in transit over untrusted networks;
- The use of reasonable precautions to protect the security of the information that is collected; and
- The use of the availability principle that is designed to help ensure the availability of the systems supporting the webMethods Cloud System.

Software AG Cloud establishes operational requirements that support the achievement of security and availability commitments, relevant laws and regulations, and other system requirements. Such requirements are communicated in Software AG Cloud’s system policies and procedures, system design documentation, and contracts with customers. Information security policies define an organization-wide approach to how systems and data is protected.

E. Non-Applicable Trust Services Criteria

Common Criteria (CC)		
Non-Applicable Trust Services Criteria		Software AG Cloud’s Rationale
CC 6.4	The entity restricts physical access to facilities and protected information assets (for example, data center facilities, back-up media storage, and other sensitive locations) to authorized personnel to meet the entity’s objectives.	N/A – The Company’s IaaS provider is responsible for physical and environmental security controls.

F. Subservice Organizations

The Company utilizes subservice organizations to perform certain functions. The description includes only the policies, procedures, and control activities at the Company and does not include the policies, procedures, and control activities at the third-party service organizations described below. The examination by the Independent Service Auditor did not extend to the policies and procedures at these subservice organizations.

Complementary subservice organization controls, controls that management of the service organization assumes will be implemented by the subservice organization and are necessary to achieve the service organization’s service commitments and system requirements based on the applicable trust services criteria, along with the associated subservice organizations, are included within the table below. Management also describes the activities performed to monitor the effectiveness of controls at the subservice organization. Each user entity’s internal control must be evaluated in conjunction with the Company’s controls described in Section IV of this report, taking into account the related complementary subservice organization controls expected to be implemented at the subservice organization as described on the following page.

Subservice Organization	Services Provided/Complementary Controls/Monitoring Controls	Associated Criteria
Amazon Web Services (AWS)	<p>The Company uses Amazon AWS Elastic Compute Cloud (Amazon EC2) for its third-party hosting of servers and equipment in an Infrastructure-as-a-Service environment, including the restriction of physical access to the defined system including, but not limited to, facilities, backup media, and other system components such as firewalls, routers, and servers. The Company also uses the Amazon Relational Database Service (Amazon RDS) and AWS Simple Storage Service (S3). Amazon RDS is a Platform-as-a-Service or more specifically a Database-as-a-Service. AWS S3 provides object storage through a web service interface. The following control activities are critical to achieving the Applicable Trust Services Criteria:</p> <ul style="list-style-type: none"> • Controls around the underlying infrastructure and Data Centers supporting the In-Scope production environment including environmental safeguards such as UPS, backup generators, and fire suppression; • Controls over managing infrastructure such as physical servers and physical access to backups and facilities; • Controls around the S3 databases, including controls around physical access to the backup servers and facilities, high availability replication, physical access to storage systems, operating system installation and patches, database software installation and patches, and system configuration; • Controls over the Amazon RDS including operating system installation and patches; database software installation and patches; and routers/firewalls monitoring and maintenances; • Controls over managing AWS Platform-as-a-Service components such as physical servers and operating systems including applying critical patching for this infrastructure; • Controls around the change management processes for the AWS Infrastructure-as-a-Service Platform and Azure Platform-as-a-Service Platform components as applicable. 	<p>CC 5.2* CC 6.1* CC 6.2* CC 6.3* CC 6.4 CC 6.8* CC 7.5* CC 8.1* CC 9.1* A1.1* A1.2* A1.3*</p>

Subservice Organization	Services Provided/Complementary Controls/Monitoring Controls	Associated Criteria
	<p>In addition, the Company has identified the following control activity to help monitor the subservice organization:</p> <ul style="list-style-type: none"> On an annual basis, CloudOps selects a customer's full backup for each product to verify the integrity of the backup data. On an annual basis, management evaluates the third parties who have access to confidential data and/or who perform a managed service related to the operation of the In-Scope production environment and reviews the third parties' System and Organization Control reports such as SOC 2 reports or other related security evaluations. Corrective actions are taken, if necessary. 	
Microsoft Azure	<p>The Company uses Microsoft Azure for its third-party hosting of servers and equipment in an Infrastructure-as-a-Service environment, including the restriction of physical access to the defined system including, but not limited to, facilities, backup media, and other system components such as firewalls, routers, and servers. The Company also uses the Azure SQL Database and/or SQL Managed Instance service, which is a Platform-as-a-Service or more specifically a Database-as-a-Service. The following control activities are critical to achieving the Applicable Trust Services Criteria:</p> <ul style="list-style-type: none"> Controls around the underlying infrastructure and Data Centers supporting the In-Scope production environment including environmental safeguards such as UPS, backup generators, and fire suppression; Controls over managing infrastructure such as physical servers and physical access to backups and facilities; Controls around Azure Storage redundancy, including controls over data replication, physical access to storage systems, system installation and patching, and system configuration; Controls over the monitoring of the Office 365 / OneDrive Software-as-a-Service components including backups, anti-virus, and incidents related to security and availability including responding to items identified; Controls over the SQL Database and SQL Managed Instance including database backups, operating system installation and patches, encryption, database software installation and patches, and routers/firewalls monitoring and maintenances; Controls over managing Azure Platform-as-a-Service components such as physical servers and operating systems including applying critical patching for this infrastructure; Controls around encryption related to Azure; and Controls around the change management processes for the Azure Infrastructure-as-a-Service Platform and Azure Platform-as-a-Service Platform components as applicable. 	<p>CC5.2* CC6.1* CC6.2* CC6.3* CC6.4 CC6.8* CC7.5* CC8.1* CC9.1* A1.1* A1.2* A1.3*</p>

Subservice Organization	Services Provided/Complementary Controls/Monitoring Controls	Associated Criteria
	<p>In addition, the Company has identified the following control activity to help monitor the subservice organization:</p> <ul style="list-style-type: none"> On an annual basis, CloudOps selects a customer's full backup for each product to verify the integrity of the backup data. On an annual basis, management evaluates the third parties who have access to confidential data and/or who perform a managed service related to the operation of the system and determines their risk-rating based on their level of access, the sensitivity of the related data, and the impact to operations. Based on this risk rating, management either performs a vendor security assessment of the third party, reviews the third party's System and Organization Control reports such as SOC 2 reports, or the third party is subjected to continuous monitoring controls. Corrective actions are taken, if necessary. 	

** The achievement of design and operating effectiveness related to this criterion assumes that the complementary controls at this subservice organization that support the service organization's service commitments and system requirements are in place and are operating effectively.*

G. User Entity Controls

Software AG's controls relating to the system cover only a portion of the overall internal control structure of each user entity of the Company. It is not feasible for the Company's service commitments and system requirements to be achieved based on the applicable trust services criteria solely by the Company. Therefore, each user entity's internal control must be evaluated in conjunction with the Company's controls and related testing detailed in Section IV of this report, taking into account the related complementary user entity controls identified within the table below, where applicable. As applicable, suggested control considerations and/or complementary user entity controls and their associated criteria have been included within the table below.

Management has highlighted criterion in which complementary user entity controls were assumed in the design of the Company's system with an asterisk. In order for user entities to rely on the controls reported on herein, each user entity must evaluate its own internal control environment to determine if the identified complementary user entity controls have been implemented and are operating effectively.

Furthermore, the table below includes suggested control considerations that the Company believes each user organization should consider in developing their internal controls or planning their audits that are relevant to the Company's controls detailed in this report, however, such control considerations are not required to achieve design or operating effectiveness for the Company's service commitments and system requirements based on the applicable trust services criteria. The following list of suggested control activities is intended to address only those policies and procedures surrounding the interface and communication between the Company and each user entity. Accordingly, this list does not allege to be, and is not, a complete listing of all the control activities which provide a basis for the assertions underlying the control environments for the Company's user entities.

User Entity Control	Associated Criteria
User entities are responsible for compliance with all applicable laws, including without limitation, all applicable export and import laws and regulations of such other countries, associated embargo and sanctions regulations and prohibitions on export for certain end uses or by any prohibited end users.	CC 1.3 CC 6.5

Software AG Cloud

SOC 3[®] Report - SOC for Service Organizations: Trust Services Criteria for General Use
webMethods Cloud System

User Entity Control	Associated Criteria
User entities are responsible for immediately notifying Software AG of any actual or suspected information security breaches, including compromised user accounts.	CC 2.3
User entities are responsible for ensuring the confidentiality of any user accounts and passwords assigned to them for use with the cloud systems.	CC 5.2 CC 6.1 CC 6.2 CC 6.3 CC 6.7
User entities are responsible for access control to the tenant application and may grant CloudOps personnel access providing user credentials, function privileges, and client license to access the data.	CC 5.2* CC 6.1* CC 6.2* CC 6.3* CC 6.7*
User entities are responsible for establishing logical security controls to restrict and monitor access to cloud systems.	CC 5.2* CC 6.1* CC 6.2* CC 6.3* CC 6.7*
User entities are responsible for end-user administrative privileges within their cloud tenant and have control over who is authorized to access their environment, including adding, changing, and removing user access.	CC 5.2* CC 6.1* CC 6.6* CC 6.7* CC 6.8*

** The achievement of design and operating effectiveness related to this criterion assumes that the complementary user entity controls that support the service organization's service commitments and system requirements are in place and are operating effectively.*

Aprio 