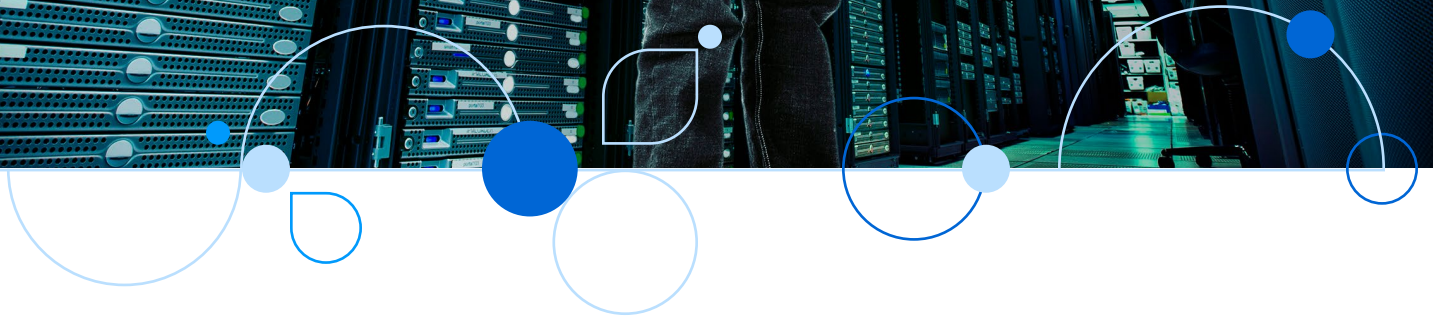


Hosted managed services for SAS® technology



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Running analytics software in the cloud can vastly simplify the deployment, maintenance and adoption of analytics across the enterprise. It will support innovation, ideation, collaboration, sharing and more. This is because the cloud helps users focus on the process of analytics itself, while removing the internal challenges of getting environments up and running. Instead, it simplifies access to software, increasing the speed to innovation.

Hosted managed services is an excellent option for organizations looking for a comprehensive analytics solutions based on SAS® industry-leading products - and delivered by the insiders who know these tools best. Hosted managed services give you the option to deploy the technology on an infrastructure that has been tuned specifically for the solution.

All SAS® Viya® offerings are available as a hosted managed service in Microsoft Azure. Due to the combination of cutting-edge technology and dedicated service and support, SAS hosted managed services have helped customers drive business value in a number of key ways:

- Improved agility. By optimizing the SAS environment and SAS jobs, we can dramatically increase customers' throughput of analytics, improve their ability to quickly respond to business issues and free up analysts to produce more insights. SAS has been hosting customer solutions in the cloud for over 20 years, so its customers can benefit from qualified experts.
- Single provider to engage. When you run your environment on-premises, you have multiple vendors each providing separate service level agreements. You also have different departments supporting the environments. With a hosted managed service you have one service level agreement and a single organization to engage with, ensuring incidents are resolved quicker.
- The same service allows you to have all the SAS expertise under one roof with one point of contact (e.g., dedicated cloud success managers) supporting your SAS solution.
- Optimized infrastructure. With SAS, we help customers optimize the storage and compute services used, where customers pay for the optimal hardware for their specific needs rather than purchasing hardware that either sits idle or isn't sufficient.
- Speed to value. Customers are set up with their cloud solution quickly so they can realize the value of running their analytics workloads on the Azure infrastructure.
- And finally high availability. Providing an always on environment that has a 99% service level agreement, combined with the best SAS talent in the world provides a resilient, highly available analytics environment that "just works," driving productivity and reducing risk for critical processes.

This paper highlights the primary advantages of choosing SAS as your hosted managed services provider. The paper concentrates on four main areas where your organization benefits from SAS hosted managed services: performance, security, service operation management and stability.

Performance

Performance is one of the main reasons customers rely on SAS for hosted managed services. With this deployment method, you get dedicated infrastructure, optimal hardware sizing and tailored alerting. Here's how SAS delivers exceptional performance through its hosted managed services:

Optimal cloud infrastructure

Choosing a hosted managed services solution means you receive the benefit of SAS' experience to configure the optimal hardware for your SAS hosted applications and solutions. This is critical for industries or use cases that involve large volumes of data. Big data deployments are notoriously difficult to maintain from an infrastructure perspective.

Partnerships with infrastructure and storage vendors enables SAS to influence technology road maps that benefit our customers.

SAS has experts that can determine what cloud infrastructure each solution needs to perform effectively and efficiently. By selecting SAS hosted managed services, these experts can specify the right hardware and associated disk space that will achieve the ideal performance for your hosted solution.

Secure, no-hassle access

SAS Viya in the cloud releases you from the IT burden of installing and maintaining server software in the data center and client software on the desktop. Now, all a user requires is a web browser and valid credentials. When the credentials are federated from your own identity provider, users get the benefit of a seamless login but you retain control of what they access.

Dedicated computing infrastructure

By working with SAS, you can be confident you have dedicated infrastructure to support the hosted managed services solution. The performance, stability and security of your solution will not be compromised from sharing critical resources with other customers.

At the core of all SAS solutions is the ability to handle large data volumes, because these solutions require more power and infrastructure to support them. SAS hosted managed services harness the power you need to run your analytic solutions at the highest levels of efficiency.

Early and pre-emptive detection of incidents

SAS monitors your solutions to achieve the thresholds required for optimal performance. For your hosted managed service, SAS applies expert knowledge to set up the most effective monitoring and alerting framework for your solution. As your solution grows and changes over time, SAS adjusts these monitors and alerts, when necessary, to ensure the solution retains optimal performance.

Hosted managed services customers benefit from the best SAS solution working in tandem with the most optimally performing infrastructure. SAS sets up its customers' solutions in the beginning and maintains the infrastructure at the peak level of performance throughout the life cycle.

Hosted managed services are an excellent option for organizations looking for a comprehensive business analytics solution based on the industry's leading products.

Security

SAS has experience with hosting sensitive data for organizations around the world. It provides hosted managed services for customers in many sectors, including government, financial services, pharmaceuticals and health care.

For all hosted managed services, SAS offers security across major areas:

- Logical - network, database, operating system and application.
- Dedicated VNet for each customer environment.
- Common user identity throughout the platform.
- Intrusion detection and data loss protection.
- Personnel access – administrator access segregated from end users.
- Fully audited and logged with centralized reporting.

Data protection warranties (with approved liability levels) for personally identifiable information

Data protection is a significant step in an organization's due diligence process when selecting a company to host its solution. SAS understands its significance and takes every precaution to protect its customers.

SAS provides contractual guarantees to its customers for all non-public data collected and maintained in any of its data centers. It maintains robust and fit-for-purpose technical and organizational approaches to security for its hosted managed services solutions.

Documented data classification and handling policy

When implementing hosted managed services, SAS works with customers to determine the most appropriate data classification level for information hosted in each solution. Customers classify their data in SAS custody, or under its control into one of four levels: public, internal use only, confidential and restricted. There are standardized procedures for handling customer data at each level of classification, and all staff working on hosted managed services solutions are trained on data classification and handling policies.

Continuous improvement efforts

SAS hosts solutions for privacy-conscious industries. As a result, SAS' security policies and controls are regularly audited by third parties, including customers and SAS' own auditors. This allows SAS to maintain its certifications (SOC 2, SOC 3, ISO 27001, etc.). By committing to regular audits, any potential improvements to its security process may be highlighted and fed into continuous service improvement projects.

SAS additionally regularly engages third-party consultants to assess its methodologies, with the goal of aligning to best practices and standards, as well as optimizing service delivery and providing continual improvement.

SAS also monitors external standards, best practices and industry and regulatory requirements that are applicable to its customers. Additionally, it benchmarks its policies and standards against relevant third-party or government frameworks.

SAS has experience hosting sensitive data for organizations across a wide variety of sectors globally, including government, banking/financial services, pharmaceuticals and health care.

Secure network communications

SAS requires a site-to-site VPN when connecting directly to on-premises data sources. This provides a secure tunnel between SAS and the databases you own. In a pure cloud deployment, we employ similar methods, such as Azure Private Link or Microsoft Peering. Allow-listing of IP addresses are used wherever external communications occur, this includes both end-user access and external data feeds or APIs. This approach prevents the visibility of SAS' presence online, reducing the opportunity for hacking attacks. If the solution does not recognize the IP of the individual attempting to access the solution, it denies the individual access.

Secure data transfer

Because data sits at the heart of analytics, it is crucial to have a robust method for receiving data into the system. All transport services are encrypted using TLS 1.2. Customers can use secure ftp and cloud-native tools to integrate with corporate data flows.

These methods ensure that files are encrypted in transit as they move from the customer to SAS over unsecured networks, and they have the benefit of simple auditability. SAS provides tools and best practices to enable its customers to use these file transfer methods quickly and easily.

Security patching of SAS® solutions

SAS tests its software and customers' hosting infrastructure for security vulnerabilities. In addition, it subscribes to daily threat notices from external sources to keep up to date of security threats in the industry. If any vulnerabilities are identified, SAS implements patches to address these vulnerabilities and reduce the risk of security incidents.

Regular maintenance

SAS Viya has adopted a continuous integration/continuous delivery (CI/CD) paradigm, this ensures that customers are automatically able to take advantage of new capability without the need to request a software upgrade.

The standard maintenance window also provides the opportunity for shared infrastructure to be kept up to date with the latest security measures and capabilities.

Access control and account management

Federated access to your SAS deployment allows you total control over which of your users can log on and the level of permission they have. Group membership within your corporate identity provider is automatically reflected within the application; if users move, or leave, these changes are also reflected. Thus ensuring an employee is immediately denied access to SAS data as soon as they are removed from your own system.

Where federation is not possible, SAS still maintains a secure environment through access control and account management policies and processes using unique user IDs and passwords. This ensures that all users are properly identified and authenticated when accessing the hosted managed services environment.

Robust subcontractor qualification and management

Whenever SAS subcontracts any services to a partner, it follows its Supplier Qualification and Management Program, including initial evaluation, approval, disapproval, and continuous improvement and management of its supplier base. While this program applies to onboarding new subcontractors, SAS also conducts regular risk assessments to ensure partners continue to meet SAS' required service and security levels. It is policy that customer material be encrypted while in transit and at rest, whenever possible.

Service operation management

Service operation management coordinates and executes the required activities and processes to ensure that SAS solutions are available and performing 24/7. Service operation includes event, incident, problem and change management.

Event management

An event may indicate something is not functioning correctly, and lead to the logging of an incident. Events may also indicate normal activity or a need for routine intervention. Event management depends on monitoring, but it goes beyond that. Event management generates and detects notifications, while monitoring checks the status of components even when no events are occurring. After an event is detected, it may lead to incident, problem or change management. Alternatively, it may simply be logged in case the information is needed. A response to an event can be automated or may require manual intervention.

Incident management

The objective of incident management is to restore normal service operation as quickly as possible and minimize the adverse effect on business operations. This keeps things running at the best possible levels of service quality, helping to keep availability levels high.

Problem management

Problem management helps to identify the cause of an error in the SAS software and infrastructure that is usually reported as occurrences of related incidents. Resolving a problem leads to addressing the error that prohibits related incidents from occurring in the future.

Change management

The objective of change management is to ensure that standardized methods and procedures are used for efficient and prompt handling of all changes to a hosted environment in order to minimize the number and impact of any related incidents upon service.

Stability

Customers choose hosted managed services to guarantee solution availability at all times. SAS offers various levels of stability - ranging from 99% warranty, best-practice installation, provisioning of all third-party software and incident response times.

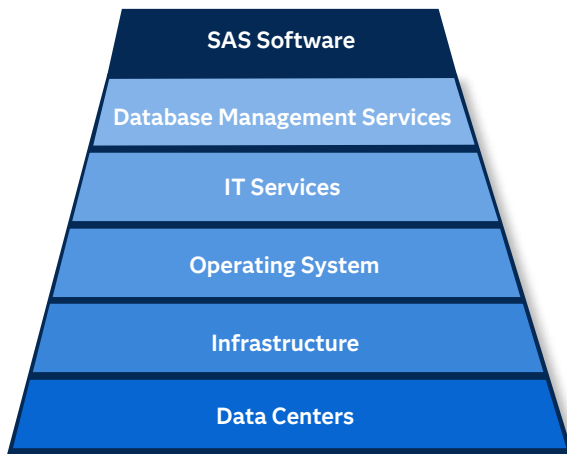


Figure 1. SAS software is dependent on the availability of all hosted managed service areas.

SAS guarantees 99% uptime on all its software for hosted managed services. It views the uptime of its software as part of the overall IT ecosystem. As shown in Figure 1, the availability relies on uptime of all hosted managed services areas, including database management services, IT services, operating systems, infrastructure, data centers and more.

Best-practice installation of SAS® software

To optimize performance, stability and security, SAS uses its own expertise and best practices to install each solution. Using CI/CD and automation – all software is installed according to a set of common standards. This means any technical support staff member can answer customer questions and resolve issues quickly.

Incident response targets

For any incident affecting software availability, SAS alerts its hosted managed services customers based on agreed-upon capacity thresholds. This ensures customers receive timely communications. As a result, customers have confidence that SAS can appropriately manage any type of incident level.

The priority of an incident is based on impact (does it affect the entire environment, part of the environment or one or more users) and urgency (how long the incident has a significant impact on the customer's environment). The priority determines response and recovery planning. SAS maintains regular customer communications while resolving the incident.

For more major incidents that indicate the possibility of an underlying problem, SAS performs a root-cause analysis with the objective of preventing a recurrence of the incident.

Data center coverage

Through our partnership with Microsoft, SAS implements all its hosted managed services in Microsoft Azure. Global data center coverage ensures that all hosted managed services are delivered anywhere globally to ensure the best performance possible.

Each data center provides the same security, compliance controls and leveraged services required to support SAS solutions while ensuring customer data is kept safe and secure.

Defined standards and documentation for SAS® installations

All implementations, (including batch jobs and ETL jobs when purchased) are handled following the same standards and documented following the same process, providing standardization and common sharing of information across the team. This means that any of the support staff can manage and respond to any issue effectively.

SAS uses a common documentation system to manage all hosted managed services solutions. This installation and configuration documentation serves as a tool for rapid issue diagnosis and resolution.

Monitoring and alerting of storage capacity configured to SAS®

SAS uses systems to monitor its customers' storage capacity. The monitoring systems it uses include advanced warning flags to ensure stability to prevent its customers from experiencing any system degradation.

Backup of all key data

SAS backup data is moved onto low-cost geo-redundant storage to provide a fallback for resilience purposes. If a major incident occurs, the solution can be restored from its latest backup as a last resort.

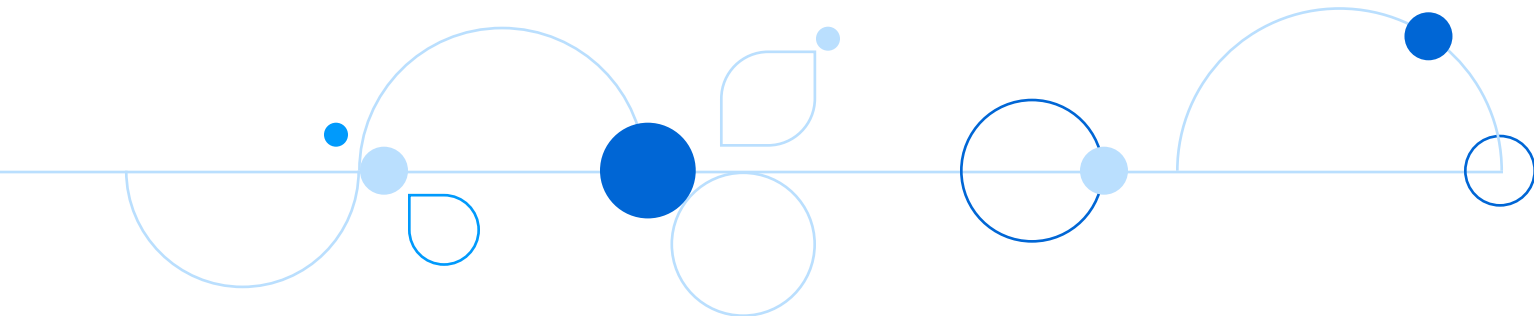
SAS Business Continuity Management Program

SAS maintains a Business Continuity Management (BCM) Program aimed at protecting its key assets and continuing its critical business functions upon the occurrence of a disruptive incident. The SAS BCM Policy provides a layer of program governance, formalizing roles and responsibilities and standardizing specific activities including annual plan maintenance and testing, staff training and management program review. For additional information regarding SAS' BCM Program, refer to the [Business Continuity Management white paper](#).

Conclusion

All SAS Viya offerings are available as a hosted managed service in Microsoft Azure. Performance, security, operation management and stability are the core deliverables customers can rely upon the SAS team to deliver with any hosted managed service deployment.

If you would like more information on anything contained within this paper, please contact your local SAS representative.



Learn more about **SAS® Viya®**.

