Google Cloud & Quality Management System
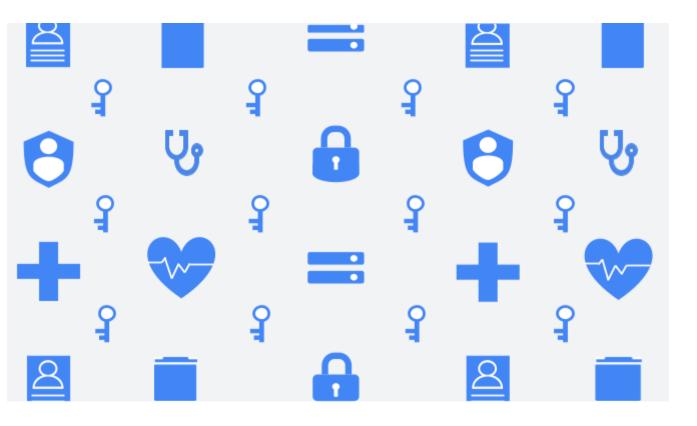
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Disclaimer

This whitepaper applies to Google Cloud products described at https://cloud.google.com/. The content contained herein is current as of April 2022. Google's quality management policies and systems may change going forward, as we continue to improve our products and services.

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What is a Quality Management System (QMS)?

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A quality management system (QMS) is a collection of business processes that enable an organization to create and deliver high-quality products and services that meet customer requirements and increase customer satisfaction. A QMS helps coordinate and direct an organization's activities to continually monitor, manage, and improve the quality of its products and services. It therefore helps to meet an organization's regulatory and customer requirements, while making continuous improvements to its operations.

An effective QMS focuses on establishing consistent and well-defined processes in alignment with the organization's strategies that execute in a controlled and repeatable manner. This process-based approach aims to achieve high standards of quality in all stages of the product or service lifecycle and ultimately, helps in increasing customer satisfaction. Other benefits of a QMS include reducing risks, costs, and waste, preventing mistakes, identifying training and improvement opportunities, engaging staff, aiding in compliance efforts, setting organization-wide direction, and communicating readiness and ability to produce consistent results.

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Collection of business processes that enable an organization to create and deliver high quality products and services that meet customer requirements and increase customer satisfaction

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Scope

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This whitepaper will reference QMS as it applies to Google Cloud Platform (GCP), also referred to as Google Cloud. This paper is intended to help customers of Google Cloud understand our QMS and provide insight into how Google Cloud can help them deliver high-quality products and services while running their workloads on Google's infrastructure. This paper is intended to be for informational purposes only. Nothing in this whitepaper is intended to provide you with or should be used as a substitute for legal advice.

What is ISO 9001?

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ISO 9001 is an international standard that specifies the minimum requirements for establishing a QMS and is part of the ISO 9000 family of standards. It employs a process approach that enables an organization to plan its processes and their interactions. It also incorporates the Plan-Do-Check-Act (PDCA) cycle and risk-based thinking. Organizations of varying types and sizes, operating in a variety of sectors, use this standard to demonstrate their ability to consistently provide products and services that meet customer and regulatory requirements. Designed to be a powerful business improvement tool, implementing the requirements of ISO 9001 can provide a range of benefits such as reducing costs, increasing customer satisfaction, streamlining your supply chain operations, and building a sustainable business.

Having evolved from the quality management standards published by British Standards Institution (BSI), ISO 9001 was first published in 1987 by the International Organization for Standardization (ISO), a worldwide federation of national standards bodies. The current version of ISO 9001 was released in September 2015 and reviewed and confirmed in 2021. GCP is certified as ISO 9001:2015 compliant after undergoing an audit by an independent third party. This certification demonstrates GCP's commitment to delivering high quality products and meeting the needs of customers and applicable statutory and regulatory requirements.

GCP's ISO 9001:2015 certification means that these services provide reliable, ISO 9001 compliant infrastructure upon which customers may build their own high-quality products and services. However, it is important to note that customers are still responsible for ensuring that their implementations are ISO 9001:2015 compliant, engaging an independent assessor to evaluate their compliance and obtaining an ISO 9001:2015 certification for their systems and processes.

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Quality Management Principles

ISO 9001 is based on the seven (7) quality management principles described in ISO 9000 and so is Google Cloud QMS. These principles guide an organization's quality management program, help boost awareness of its duties and commitments in fulfilling the needs and expectations of its customers and other interested parties, and facilitate the development of an efficient QMS.

In the sections that follow, we will analyze each of the quality management principles, their associated benefits, how we put these principles into practice, and how Google can aid your quality compliance efforts. These principles are not listed in priority order, their relative importance can be expected to vary from organization to organization and change over time, and their interrelationships are intended to be seen as a whole and not in isolation of each other.

The quality management principles are:

7 key principles of quality management

1. **Customer Focus**

   Google commits to meeting or exceeding customer expectations. Focus on users is a primary design consideration for Google's infrastructure, applications, and personnel

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operations, and we highlight effective customer communication as an essential element of delivering customer value and satisfaction.

Through feedback collected from our customers (refer to [Why Google Cloud](#)), we have noted that customers value security, speed, reliability, and productivity. At Google, we believe this is achieved by following defined practices for effective software development processes and customer communications. Google therefore, focuses on Systems Development Lifecycle (SDLC) and Cloud Platform Support (CPS) as key components of our QMS.

Our reputation and trustworthiness depend on managing products in line with customer expectations and providing quality customer support. As such, customer needs and expectations are captured and understood, and requirements are clearly articulated to become inputs to our QMS and SDLC process. Our CPS organization provides support services to GCP customers and establishes methods of communication such that inquiries, feedback, and complaints are handled expeditiously and professionally. CPS also maintains a team dedicated to workforce management to monitor incoming customer request volume and augment staffing to meet customer demand. CPS empowers product excellence and provides continuous insights to product teams about frequent customer reported issues by coordinating a bi-annual survey process that captures customer feedback on products and services which is channeled back to product teams.

Google serves many different industries, and we recognize that our customers may be subject to various laws, regulations, and requirements for quality management. To enhance our quality management practices and our alignment with customers' industry-specific frameworks, we have worked with each sector to address their specific requests and designed a QMS that represents industry leading practices while aligning with the Quality Management framework developed by ISO 9001:2015 that is followed by leading organizations around the world.

2. Leadership

We understand that quality products are the key to upholding the trust our customers place in us and that leadership involvement and commitment play a key role in defining the quality culture of an organization. Our Management spearheads our commitment to quality through several measures such as:

- Establishing a QMS policy and quality objectives in line with the strategic goals of the company
- Integrating QMS requirements into organizational processes
- Providing the environment and resources required for the establishment, management, and improvement of our QMS

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- Communicating and incentivizing the importance of an effective QMS and of being compliant with the requirements of the related standards, policies, and procedures
- Outlining the QMS responsibilities of various teams across the organization such as Operations, Engineering, Security, Legal Department, and CPS among others
- Establishing customer support services to gather customer feedback for insights to continuously improve our products through SDLC processes and the CPS Program.

Google's quality policy is the foundation of its quality management program and is owned by Google's VP of Security Engineering. The policy commits to controlling and maintaining the quality of Google Cloud products and related software development processes, limiting Google's exposure to the risks arising from product quality issues, promoting continual improvement, and maintaining compliance against customer, legal and regulatory requirements. Our quality management program is governed through the Google Cloud Engineering and CPS Teams that are led by Google's VP of Engineering and VP of Cloud Platform Support, with the support of Google's VP of Security Engineering.

Unified and perceptible leadership involvement in and commitment to the QMS at Google fosters increased effectiveness and efficiency in meeting the organization's quality objectives, improves communication between processes, levels, and functions of the organization and strengthens the capability of Google and its people to deliver desired results.

3. Engagement of People

We believe that for an effective and efficient QMS, it is important to involve people at various levels and to respect and support them as individuals through recognition, empowerment, and upskilling opportunities. Enhanced involvement improves understanding of the organization's quality objectives, increases motivation, and promotes trust and collaboration throughout the organization.

Google involves its employees, customers, and other interested parties from the first stage of the QMS context setting by gathering their requirements and feedback related to processes and procedures supporting QMS. Annual surveys for employees are conducted to identify organizational strengths and opportunities, including feedback related to internal processes and procedures supporting QMS (such as tooling, documentation, customer focus, etc.). The surveys serve as inputs to internal process improvement and product design. Google's People Operations (Google HR) supports Google's growth and inclusive culture by keeping people at the center of what we do, through a rigorous hiring process and regular training, awareness, and evaluation programs. Our quality policy, objectives, and guidelines related to QMS are communicated to relevant parties such as employees and vendors highlighting accountability for the quality implications of their work and their contribution to our QMS
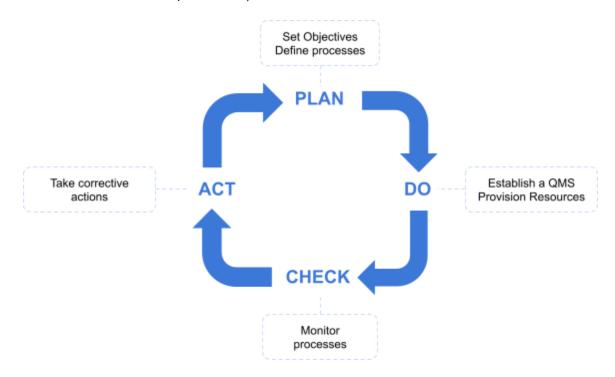
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effectiveness. QMS related internal and external communications are conducted both periodically and on an ad-hoc basis as determined by risk assessments and management review. Regular team meetings, training and awareness programs and external communications programs are among the methods employed for QMS communications.

4. Process Approach

Process approach is a management strategy that encompasses the PDCA cycle and risk-based thinking. It strives to manage and control processes and asks that we not only understand what our core processes are but also how they interact and fit together to form a coherent system.

PDCA is an integral part of our process approach and it stands for:

- Plan: set the objectives of the system and processes to deliver results ("What to do" i.e., quality management objectives and "how to do it" i.e., key processes)
- Do: implement and control what was planned (i.e., implementing a QMS and providing the resources required for its functioning)
- Check: monitor processes and results against policies, objectives and requirements and report results (i.e., establishing metrics and monitoring processes)
- Act: take actions to improve the performance of processes (i.e., corrective action and continual improvement)

Plan-Do-Check-Act cycle applied to Google Cloud QMS

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PDCA operates as a cycle of continual improvement, with risk-based thinking at each stage.

Google Cloud's QMS uses the PDCA approach to process planning. We have defined our quality management objectives and four key process groups to achieve them. By managing the inputs, activities, controls, outputs, and interfaces of these processes; we endeavor to establish and maintain system effectiveness. These key process groups are:

- Leadership and planning processes
- Operational processes for software design and development
- Evaluation and monitoring processes
- Improvement processes

Google plans, implements, and manages the processes needed to deliver quality products and services. We determine product and process requirements, and acceptance criteria, provision required resources, manage process implementation, and maintain documentation of QMS activities.

Furthermore, the effectiveness of each process and its subsequent output is measured and evaluated through regular internal audits, quality inspections and data analysis. We use Service Level Objectives (SLOs) that are linked to our objectives to control and monitor our processes, as well as assessments to determine the risks and opportunities inherent to each process. We use nonconformity trends and indicators, monitoring and measurement, audit results, and customer satisfaction data along with corrective action to improve process performance and the conformity of our products.

Risk-based thinking is incorporated as part of Google's day-to-day operations to capture and react to perceived risk and opportunity, through measures such as:

- Defined risk management procedures including standalone QMS risk assessments to identify quality specific risks
- Objectives and Key Results (OKRs) process that helps identify and manage project, operational and performance risks and contributes to effective allocation of resources across the organization
- Controlled change management procedures that manage continual improvement in a manner that the integrity of the QMS is maintained during change

Additionally, we emphasize quality throughout the lifecycle stages of planning, requirements gathering, design, development, testing, deployment, maintenance, and customer support through our SDLC processes and Cloud Customer Support Program for Google Cloud product and service offerings.

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5. Improvement

Improvement (in its processes, capabilities, and levels of desired outcomes such as customer satisfaction) is essential for an organization to react to internal and external changes, create new opportunities and even maintain current levels of performance.

Google determines and selects opportunities for improvement and implements appropriate measures to meet customer requirements and enhance customer satisfaction including:

- Improving products and services to meet current and future requirements
- Detecting, correcting, preventing, or reducing non-conformities and undesirable effects
- Improving the performance and effectiveness of the QMS

One form of improvement Google undertakes is corrective actions resulting from monitoring activities to address new findings or QMS deficiencies. We conduct governance activities including the systematic verification of QMS effectiveness by undertaking internal audits, analyzing performance data, monitoring OKR, reviewing trends and SLOs. Regular reviews and data reporting help verify that our QMS is effective and has the ability to react to emerging issues. The corrective action process includes root cause analysis (RCA) to determine the cause of these non-conformities, evaluating possible actions to avoid recurrence, tracking the progress of corrective actions, and recording the findings, actions taken, and their results. Control owners and other relevant stakeholders are kept informed of the status of deficiencies from detection through resolution and an internal tracking tool documents and tracks corrective actions.

Our proactive approach to quality management helps improve quality and expand business opportunities, enabling entire organizations to optimize operations and enhance performance. Maintaining a high standard of quality is part of our core values and the philosophy of product excellence and high-quality software apply to Google, our services, processes, and personnel operations. Google consistently invests, develops, and innovates in these areas and demonstrates industry leadership in quality management.

6. Evidence-based decision making

Decision making can be a complex process involving multiple types and sources of inputs and their subjective interpretations leading to an amount of uncertainty. At Google, we combat this uncertainty with improved decision-making processes, enhanced assessment of process performance, and our ability to review and challenge decisions and demonstrate the effectiveness of past decisions.

To facilitate the alignment of our QMS with our strategy, we collate and analyze pertinent information from internal and external factors to determine the potential impact on our context and subsequent business strategy. Internal factors include conditions related to

our organizational activities, products, services, strategic direction, culture, people, size, complexity, knowledge, performance, processes, and systems. External factors include social, cultural, political, legal, contractual, regulatory context, and technological and competitive trends.

Google performs periodic and ongoing assessments of in-scope QMS processes wherein quality objectives related to the processes are monitored and reviewed by the management and leadership teams at various levels and process lifecycle points:

- Google's Engineering Compliance team maintains a dashboard that monitors compliance with SDLC controls and change management procedures on a per product basis and follows up with respective teams to track and resolve discrepancies
- Internal audit performs regular audits over the QMS control environment, and reports associated with the audits are made available to the audit committee and relevant stakeholders
- Internal Audit also works with external auditors to drive efficient audits and collaborates with internal functions to improve processes
- CPS analyzes incoming customer support case volume with live monitoring to help manage customer inquiries within SLOs. In addition, monthly business reviews are performed with senior Google Cloud leadership. In case actual Key Performance Indicators (KPIs) are not meeting targets, RCA is performed to determine steps for improvement
- Management review of the QMS is performed yearly and the results are actioned for continued QMS suitability, adequacy, effectiveness, and alignment with our strategic direction

Regular reviews and accurate data reporting allow for effective decision making and helps evaluate, strengthen, and improve our QMS.

7. Relationship Management

We recognize that we have a unique set of interested parties who contribute to creating and maintaining an efficient QMS and whose needs and expectations change and develop over time. At Google, we strive to engage our various stakeholders by fostering mutually beneficial relationships based on trust and continued success.

Google directly conducts the data processing activities that are behind providing our services. However, we may engage some third-party suppliers to provide services related to customer and technical support. In such cases, our vendor onboarding processes (that includes consideration of vendor's requirements from Google) facilitate streamlined supply chain integration. Prior to onboarding, vendor security assessments

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are conducted, and appropriate contracts are entered into to review vendor practices and clarify vendor obligations.

Google collects, monitors and reviews insights and information obtained from our stakeholders to help derive and maintain a continual understanding of each group's requirements. We conduct customer feedback surveys via the Cloud Customer Support Program to establish the requirements of and engage with clients and customers. We collaborate with the external research community and regulators via community forums, marketing research, and participation in workgroups related to standards and regulation development to understand their expectations from Google. This helps us engage our stakeholders and create a common understanding of QMS objectives and the value interested parties derive from them.

Conclusion

As a provider of software and services for many users and enterprises at a global scale, Google understands that the quality and security of products is instrumental in maintaining trust among our customers, and we strive to create innovative products that serve our customers' needs. We are committed to providing quality products and services and helping our customers meet their quality management objectives.

This document demonstrates Google's commitment to delivering high quality products and meeting the needs of customers and applicable statutory and regulatory requirements. It gives an overview of our quality management practices and shows how collectively they can form a basis for performance improvement and organizational excellence. Depending on the nature of your organization and the specific set of challenges it faces, there are several ways of adopting these quality management principles, establishing a QMS, and providing value to your customers. You can also leverage the quality management practices described in this document to enhance your processes and QMS.

Quality is crucial in differentiating your company from its competitors and an effective QMS helps enhance your quality metrics while preventing errors, saving money, and increasing customer satisfaction. In a highly competitive, rapidly changing, and increasingly regulated environment where quality is an integral part of top management agenda, Google holds its products and services to the highest standards of quality, enabling customers to transform their business through quality and become the quality leaders of tomorrow.

To learn more about our QMS please refer here, or to contact us, please visit https://cloud.google.com/.

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