



Global Business Continuity Program

THE GOLDMAN SACHS BUSINESS CONTINUITY & TECHNOLOGY RESILIENCE PROGRAM FOR DISASTER RECOVERY: OVERVIEW

Business continuity and technology resilience for disaster recovery is a high priority for Goldman Sachs, its subsidiaries and affiliates. Our goal is to ensure our continued ability to serve our clients and to protect their assets and the people and assets of our firm. Our Business Resilience Program has been developed to provide reasonable assurance of business continuity in the event there are disruptions of normal operations at the firm's critical facilities.

The firm has established a global, structured approach designed to ensure that the firm is prepared should an operational disruption occur. This approach addresses operational disruptions of varying scope, including, but not limited to: Goldman Sachs-only disruptions, medium scale and large scale events involving the disruption of operations and displaced personnel or a significant reduction in our workforce due to illness, injury or death and disruptions at critical third party vendors that the firm depends on. Operational disruptions caused by cyber-security incidents impacting the confidentiality, availability or integrity of our systems and the systems at critical third party vendors are also in scope. Our plans include leveraging our global resources and infrastructure through relocating impacted business operations using designated and tested business recovery solutions, as well as using critical data and applications which are replicated between geographically dispersed data centers. For example, if a local storm were to render one or more of our business units inoperable, we could perform critical functions at another Goldman Sachs office with minimal disruption, and if a problem occurred in one of our data centers, effectively shutting down our servers, we could carry on processing from another Goldman Sachs data center with minimal loss of data.

As part of our regular maintenance, we periodically test systems and processing failover to business recovery sites. Our plans also consider the potential need for our business operations to be supported by staff operating from non-Goldman Sachs premises, including their homes, through the use of secure remote access solutions should an incident occur which requires personnel to be dispersed. Potential scenarios include a biological, chemical or pandemic "event" in or near a location in which the firm does business.

No contingency plan can be failsafe or provide absolute assurance that an interruption in business will not occur or that negative consequences will not ensue from a crisis or event. Because natural and other disruptions — even if anticipated — generally are unpredictable and can change over time, no plan when originally designed or even if later modified can anticipate every contingency or need. That said, Goldman Sachs is committed to ensuring that its program is comprehensive and up-to-date, particularly as new information, techniques, and technologies become available. We may alter, add to, or eliminate specific aspects of the program as we judge appropriate for the protection of all concerned and we will keep both our clients and our own community informed of material changes.

The Goldman Sachs Business Continuity & Technology Resilience Program

We have a dedicated team of professionals responsible for training and education; for creating and maintaining the program; and for implementing, managing, and monitoring the firm's preparedness. The program, which was developed with the assistance of this team, is comprised of six key elements: Crisis Management, Business Continuity Requirements, Technology Resilience, Business Recovery Solutions, Assurance and Process Improvement / Continual Assessment.

1. Crisis Management: Coordination, Communication, and Training

Crisis Management encompasses the communication processes and response procedures by which the firm manages an operational disruption, as well as the tools, training, and exercises we use to help prepare the firm and our people for possible disruptions. Because the first two hours following an operational

disruption are often the most critical, the firm has established a multi-pronged, rapid response capability that includes:

- Formal Crisis Management Centers (CMCs) in every region of the firm's worldwide operations. The CMCs allow the firm to monitor its environment, execute preestablished crisis management procedures, and coordinate responses.
- Incident Response and Crisis Management Teams identified and trained to support the assessment, escalation, and decision making processes in an operational disruption.
- Communication plans with local authorities and regulators to facilitate information flow and coordination of responses.
- Communication plans with third party vendors, clients, counterparties and other stakeholders that may be impacted by a disruption to Goldman Sachs operations.
- Processes and communication tools that are periodically tested, including some automated tools, to notify key stakeholders and first responders quickly at the onset of an operational disruption.
- Training for all employees on crisis response and resources available for reporting incidents with the potential to impact GS people or facilities.
- Standard contractual agreements with critical third party vendors include notification protocols with Goldman Sachs in the event of a disruption at the vendor.

The firm's Crisis Management responses are periodically rehearsed. The firm carries out both desktop drills and live exercises that reinforce these arrangements and allow the firm to study and improve its program and processes. Our framework takes into account the risk profile of particular locations or regions in the design and execution of the drills and exercises including natural disasters, geopolitical events and other environmental or health hazards.

2. Business Continuity Requirements

Business Continuity focuses on protecting client assets and assuring that the firm is able to continue business operations in the event of a operational disruption.

Central to the firm's business recovery efforts is a requirement that each Goldman Sachs business unit develop, test, and maintain plans documenting their recovery requirements for each of its core functions. As part of these plans, each business unit identifies critical risks and puts in place the appropriate level of business controls and functionality necessary to mitigate those risks. The resultant plans document the functional requirements — equipment, applications, vital records and regulatory reports, Business Recovery Solutions, and recovery teams and tasks, along with third party vendor dependencies — needed to reestablish essential business operations while accounting for any regulatory restrictions that may be in place. The plans also assess the impact of an operational disruption on the firm's business constituents, banks, and counterparties.

3. Technology Resilience

Technology Resilience focuses on restoration of the firm's core infrastructure, including networking, applications, market-data feeds, and other shared technologies to ensure the continuation of critical business systems processing. Applications must be classified depending on the criticality of the business operations they support, and their Recovery Time Objective (RTO) must be defined to document their recovery expectations. Applications are then prioritized based on their classification which drives the frequency of application testing.

Wherever practicable, Goldman Sachs separates the people conducting business from the technology infrastructure supporting the business, housing them in separate buildings in order to reduce the likelihood of simultaneous personnel and systems disruptions.

Buildings are prioritized based on their criticality to the business and resilience risks are taken into account when they are established, including diversity of utility services. Where resilience is a requirement, buildings are equipped with backup generators which are automatically activated upon a power outage event with the most critical equipment also protected by Uninterruptible Power Supply (UPS) units. Such buildings also have redundant telecommunications connectivity which includes, where possible, carrier diversity. Additionally, systems are deployed across two or more physically distant data centers to support recovery of critical systems and data in case of a facility disruption. Critical data is also backed up to alternate locations on a regular basis.

4. Business Recovery Solutions

Business Recovery Solutions focuses on ensuring that our business operations can quickly resume when the primary workplace hosting those operations becomes inoperable or is not accessible.

People Recovery Sites — redundant work environments — have been established for critical business units. These Sites, available in all regions, are outfitted with the equipment and functional capabilities required to carry on business operations in emergency situations. The Sites are continually maintained to ensure operational readiness and are tested regularly.

Functional Transfer arrangements are in place as a further safeguard, depending on the kind and extent of the operational disruption, and subject to any local regulatory restrictions, allowing many critical functions to be performed by personnel at other principal offices of Goldman Sachs, including offices around the world.

Remote Working Environment capabilities have been developed so that the firm is able to support critical functions by enabling designated staff to work from their homes, or from other non-Goldman Sachs premises through secure remote access connections.

5. Assurance

Assurance focuses on the regular verification of the effectiveness of our Business Continuity preparedness, including testing of our Technology Resilience and Business Recovery Solutions required to demonstrate the ability to meet business recovery requirements during an actual operational disruption event.

Technology Resilience Assurance is conducted through actual failover tests, and equivalent means, based on their criticality to the businesses that depend on them, to ensure the resilience of applications and infrastructure meets the documented requirements.

Business Recovery Solutions Assurance is conducted through regular testing of each solution depending on the criticality of the business functions it will help recover. This includes:

- ensuring critical functions can be performed from the People Recovery Sites
- ensuring critical staff can effectively perform their functions from non-Goldman Sachs premises such as their home through testing their Remote Working Environment
- confirming the ability to support business operations through transfer of critical functions to staff at other principal offices of Goldman Sachs.

Compliance with Assurance requirements is tracked and significant issues escalated to management. As of the date of this statement, Assurance requirements for the last fiscal year including testing of Technology Resilience as well as Business Recovery Solutions have been fulfilled with no significant issues outstanding.

For critical third party vendors that the firm depends on, resilience assessments are conducted on the vendors' business continuity practices.

6. Process Improvement / Continual Assessment

Process Improvement assesses our state of readiness for foreseeable operational disruptions taking into account internal and external changes that impact Business Resilience. This includes:

- Consideration of any significant issues or gaps identified during testing activities.
- Continually reassessing risks and the changing threat landscape and their potential impact to the firm's resilience posture
- Identifying changes to Goldman Sachs business operations that may affect Business Resilience requirements
- Introducing new strategies and technologies as they become available.

The results of these assessments enable us to identify and integrate new risk scenarios into the program as well as drive enhancements to our Technology Resilience and Business Recovery Solutions when needed.

Client Communications and Questions

This document provides an overview of the firm's Business Continuity & Technology Resilience Program. If you have additional questions, please contact your Goldman Sachs representative. Please bear in mind that we will not respond to specific questions about the program that could compromise our security.

- Pertinent updates to this Overview will be available on the Goldman Sachs Web site at <http://www.goldmansachs.com/disclosures/business-continuity.pdf>

This Overview can also be obtained via mail by contacting your Goldman Sachs representative.

In the Event of an Operational Disruption

Should there be a significant operational disruption, clients are encouraged to visit the Goldman Sachs Web site (<http://www.gs.com>) for additional information.

Last Certified: January 1, 2019