HIPAA & Text Messaging

Security White Paper

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Updated:
May 2012

1 Executive Summary

The Mobile Commons platform provides enables our clients to send text messages to consumers' mobile phones. Our solution bridges the communication gap between businesses and consumers by allowing an enterprise-class application to interface with everyday consumer technology. While this approach to messaging has significant advantages in timely and effective business communications, the messages are transmitted and stored using carrier systems and mobile phones intended for consumer-grade communications. Because of this, the security of messages sent to consumers cannot be guaranteed once the data leaves our controlled environment.

Mobile Commons' core security strategy is geared to helping our clients utilize the amazing potential of mobile communication while maintaining an appropriate level of security. Our information security strategy can be summarized as follows:

- We maintain a high-level of security controls for our production environment such that sensitive data can be transmitted to, and stored in, our systems while maintaining the security standards that our clients require.
- We understand the security limitations of publicly assessable messaging technologies such as SMS, and how these limitations affect the potential of regulatory compliance and the individual security goals of our clients.
- We serve as a resource for our clients in helping them understand how to best leverage mobile communication while meeting the security requirements of their business and applicable regulations.

The intent of this document is to review the security requirements associated with the Health Insurance Portability and Accountability Act (HIPAA), identify the inherent security limitations inherent in text messaging (SMS), and provide information to assist our clients that deal with Electronic Health Information (EPHI) in using Mobile Commons applications in a HIPAA-compliant manner.

2 The Health Insurance Portability and Accountability Act (HIPAA)

2.1 Background

The Health Insurance Privacy and Accountability Act (HIPAA) of 1996 establishes a series of regulations for the health insurance industry, standards for the electronic health records, and requirements for the treatment, disclosure, and distribution of healthcare data. Included in the "Administrative Simplification" provisions of HIPAA are requirements intended to establish security and privacy of healthcare data dealt with by covered entities*. In 2009, Subtitle D of the Health Information Technology for Economic and Clinical Health Act (HITECH) established additional requirements for covered entities, extended the privacy and security provisions of HIPAA to business associates** of covered entities, and required that covered entities maintain contracts with their business associates that account for the extension of their responsibilities in this regard.

The security and privacy rules established through HIPAA, and the subsequent provisions established through HITECH, contain a number of technical and associated procedural controls required for covered entities and business associates in their dealings with Protected Health Information (PHI).

** The definition of covered entities in the context of HIPAA is somewhat non-specific as the types of organizations that deal with health care data can vary significantly, but is essentially intended to include organizations whose core business involves dealing with healthcare data, and in doing so deals with the data in electronic form in a way that the privacy and security rules established through HIPAA can be applied. The U.S. department of Health and Human Services (HHS) defines a covered entity as a health care provider (doctor, clinic, etc.), health plan (insurance company, HMO, etc.), or a healthcare clearing house (organization that processes and formats healthcare data).*

***A business associate of a covered entity is defined by HHS as a person or entity that conducts business with a covered entity (or another business associate of a covered entity) in a way that involves the use of, access to, or disclosure of Protected Health Information (PHI).*

2.2 Protected Health Information (PHI)

Protected Health Information (PHI), in the context HIPAA/HITECH security and privacy provisions, includes any health information* that is either explicitly or implicitly linked to an individual.

** Health information is defined in the HIPAA regulations as any information that:*
"(1) Is created or received by a health care provider, health plan, employer, or health care clearinghouse; and
(2) Relates to the past, present, or future physical or mental health or condition of an individual; the provision of health care to an individual; or the past, present, or future payment for the provision of health care to an individual; and (i) That identifies the individual; or (ii) With respect to which there is a reasonable basis to believe the information can be used to identify the individual."

2.2.1 Individual Identifiers

Under the HIPAA privacy rule, healthcare data is considered 'linked to an individual' if accompanied by any of the following 'identifiers':

1) Names
2) All geographic identifiers smaller than a State
3) All elements of dates (except year) for dates directly related to an individual, including birth date, admission date, discharge date, date of death; and all ages over 89 and all elements of dates (including year) indicative of such age, except that such ages and elements may be aggregated into a single category of age 90 or older
4) Telephone numbers
5) Fax numbers
6) Electronic mail addresses
7) Social security numbers
8) Medical record numbers
9) Health plan beneficiary numbers
10) Account numbers
11) Certificate/license numbers
12) Vehicle identifiers and serial numbers, including license plate numbers
13) Device identifiers and serial numbers
14) Web Universal Resource Locators (URLs)
15) Internet Protocol (IP) address numbers

16) Biometric identifiers, including finger and voice prints
17) Full face photographic images and any comparable images; and
18) Any other unique identifying number, characteristic, or code, except as permitted by the de-identification and re-identification provisions of the rule.

2.2.2 De-identification

The HIPAA rule allows for healthcare data to be purged of information linking it to individual(s), which results in ‘de-identified’ healthcare information. De-identified information is not subject to the security and privacy revisions established by the HIPAA rule. Simply put, healthcare information is considered to be de-identified when all of the 18 individual identifiers listed in section 2.2.1 have been removed, and there is no reasonable basis for the belief that the information can be used to identify an individual.

In the context of HIPAA, the term ‘de-identification’ assumes the use of a code or other means of record identification in the removal of personal identifiers from healthcare data, such that a covered entity or trusted broker can re-identify the data (i.e. re-link the data with one of more individual identifiers)*. This is permitted by the HIPAA rule under the following conditions:

- The code used is not derived from, or otherwise related to, one or more individual identifiers.
- The code and/or mechanism for re-identification is not disclosed for any other purpose.

**If individual identifiers are removed from healthcare data without a means for re-identification, the data is considered ‘anonymized’.*

2.3 Security Requirements

The HIPAA Security Rule, and subsequently the HITECH Act, established a number of security requirements for electronically stored and transmitted PHI (EPHI). These security requirements are categorized into administrative, physical, and technical safeguards.

2.3.1.1 Administrative Safeguards

The covered entity and business associates must have a documented set of policies and procedures that demonstrate compliance with HIPAA/HITECH. The policies and procedures must contain the following elements:

- Security management processes must be in place to prevent security violations. These processes must include means of detection, containment, and correction of security violations.
- Risk analysis processes must be in place to regularly identify and assess vulnerabilities and the associated threats to EPHI.
- Risk management processes must include the implementation of security measures to protect the confidentiality, integrity, and availability of EPHI.
- Policies must include appropriate sanctions against personnel for non-compliance with security policies and procedures.
- Operational monitoring and regular and event-driven audit procedures must be in place for systems and applications that deal with EPHI. These processes must include means of monitoring for malicious software and anomalies in data access attempts.
- A security officer must be designated with the responsibility for the development and implementation of the policies and procedures.

- Policies and procedures must ensure that personnel have appropriate level of access to EPHI. Specific procedures must be in place for the clearance, authorization, and termination of personnel that deal with EPHI.
- Policies and procedures must include processes for authorizing, establishing and modifying access to EPHI. Password management procedures must be included.
- Policies and procedures must require the isolation of EPHI from personnel, networks, and systems within the organization that do not have a role in dealing with EPHI.
- A security awareness program needs to be instituted for all personnel, including management.
- Incident Response procedures must be established to identify and respond to security incidents, mitigate the effects, and document incidents and their outcomes. Policies must include the requirement to report data breaches affecting 500 or more personnel to HHS and the media.
- Disaster recovery and business continuity plans must be established to recover and maintain availability and integrity of EPHI in the case of a significant occurrence such as system failure, facility damage, or natural disaster. These processes must be tested and evaluated regularly.
- Policies must include the requirement for business associates that deal with EPHI to maintain the necessary security controls to safeguard the information.

2.3.1.2 Physical Safeguards

Physical access to systems, networks, and media must be controlled to prevent unauthorized access to EPHI. The physical safeguards must include the following controls:

- Physical access to facilities containing systems, infrastructure, and media that store and transmit EPHI must be controlled and monitored. These controls must include visitor authorization, sign-in, and escort processes.
- Systems that deal with EPHI must not be physically accessible, and their screens must not be viewable, outside of secured areas.
- Facility security plans, access control procedures, contingency plans, and maintenance plans must be maintained and documented. Records must be maintained for the associated processes.
- The introduction, modification, and removal of systems and software on networks that deal with EPHI must be tightly controlled. A secure disposal process must be in place for systems and media that store EPHI in order to make sure the data cannot be recovered. Records must be maintained for these processes.
- Personnel and contractors must be trained on physical access procedures and their associated responsibilities.

2.3.1.3 Technical Safeguards

Controls must be implemented for access to systems and applications that deal with EPHI, and the transmission of EPHI, in order to protect the data from unauthorized access.

- Technical controls must be in place for access to EPHI that uniquely identify each user, authenticate access, and track activity. These controls must include provisions for emergency access and automatic logout after a period of inactivity.
- Encryption mechanisms are required to safeguard the confidentiality of EPHI. These controls must include encryption of data transmitted across public/untrusted networks and encryption of stored data as appropriate.
- Procedures are required to verify the identity of a person or entity seeking access to EPHI. These procedures are to include technical or procedural means of authentication or corroboration.

- Audit controls must be in place that record activity from systems and applications that deal with EPHI. Operational procedures are required that ensure the regular review of the audit records for inappropriate or anomalous activity.
- Integrity controls are required to ensure that improper modification of EPHI does not occur while the data is stored or transmitted.

3 SMS Text Messaging

3.1 Overview

SMS Text Messaging is a simple communication channel provided by the mobile phone carrier networks that facilitates text message communication to and from mobile phones and other supported devices that interface with mobile phone networks.

3.1.1 Message Transmission Process

When a text message is sent to a consumer's handset, it is first received by a Short Message Service Center (SMSC). The SMSC handles the routing and delivery for the SMS message. The SMSC will first verify whether or not the device is active, and if the device is 'roaming' outside of the geographic area of the service plan, by sending an SMS request to the Home Location Register (HLR)*. If the destination device is active, the SMSC attempts delivery. If the HLR indicates that the device is inactive, the SMSC will hold the device for a period of time, known as the 'validity period'. When an offline device comes back online within the validity period, the HLR will send a SMS notification to the SMSC, and the SMSC will attempt delivery of the message. If the message is successfully delivered, the SMSC receives delivery verification, and classifies the message as sent.

When the source and destination devices for the message are on the same carrier network, a single SMSC may be used. Where the source and destination devices use different SMSCs (typically because the devices use different carriers, but can also be due to geographic location or the device interface to the carrier network), the process depends on if the source and destination SMSCs utilize compatible technologies, and a signaling interconnection can be facilitated. If this is the case, the originator SMSC receives the routing information from the recipients SMSC and sends the SMS message directly to the destination device.

If the originator and recipient SMSCs cannot exchange routing information due to incompatible technologies, an SMS gateway** may be used to facilitate the communications between the SMSCs, or the SMSCs may utilize a communications protocol that they both support. In this case, the message is sent from the source device's SMSC to the next entity in the chain of communication (an SMS message may cross multiple SMSCs and/or SMS gateways in the process of delivery), and is ultimately delivered to the SMSC of the destination device for delivery.

** The Home Location Register (HLR) is essentially a database that contains information about the mobile subscribers. The HLR contains information necessary for the delivery of SMS communications, such as the SMSC that services the subscriber and the status of the subscriber (i.e.- active, inactive, roaming, etc.). Some carriers also utilize a separate database called the Visitor Location Register (VLR), which contains temporary information about visiting subscribers.*

*** An SMS gateway is an entity (service provider or system) that facilitates SMS message exchange between incompatible SMSCs by performing protocol translation. Some SMS gateways are classified as 'aggregators'; an SMS aggregator has agreements with carriers and other gateway providers, to exchange SMS messages on behalf of 3rd parties.*

3.2 Security Weaknesses

While the technical specification for SMS does provide for confidentiality and integrity mechanisms, these mechanisms are not required for use, and are not consistently used, by the SMSCs and SMS gateways involved in the communications process. While there are software products available for SMS security that can be used regardless of the SMSCs and gateways involved in the communications, these products require the active participation of *all* parties involved in the communications, and may not be compatible with all devices. It can be concluded that, outside of a controlled group of cooperative subscribers, cryptographic security of SMS messaging cannot be practically achieved; therefore message security cannot be guaranteed due to the heterogeneous nature of the infrastructure and systems involved in the communications.

There are several points in the SMS communications process during which the messages could be disclosed in an unauthorized manner:

- The transmission of SMS messages is typically not encrypted (some carriers may provide for encrypted services within their networks, but this is typically not extended and/or coordinated with messages that traverse multiple carrier SMSCs and/or gateways).
- Different carriers (and sometimes the same carrier) have varying store-and-forward policies for SMS messages within their SMSCs (some carriers also leverage 3rd party SMSCs). Some SMSCs purge messages immediately after delivery, while some will keep the messages for a specified (or in some cases, unspecified) period of time.
- Some carriers store SMS messages in systems outside of the SMSC for other business-related purposes. One common example of this is the storage of SMS messages in a system that is accessible online to the subscriber as a convenience.
- Data stored by a mobile phone is generally stored in the on-board memory, but can also be stored in the SIM card.

Carriers will have varying degrees of security controls in place for the networks that transmit SMS messages and the security policies and controls that govern the systems in the SMSCs that may store the SMS messages will also vary significantly among (and sometimes within) carriers. Carriers and businesses make use of 3rd party SMS gateways and aggregators to facilitate SMS messaging exchanges with different networks. Most entities that deal in the transmission of SMS messages have simply integrity controls in place to ensure that the SMS messages are not corrupted during transmission, but that is the extent of the controls that can be expected with any level of consistency. Carriers may make use of 3rd party-managed SMSCs for some or all of their SMS messaging. All of these arrangements are governed by internal policies and inter-company agreements and security assessment practices that can be dramatically inconsistent. It is typical for carriers and gateways to take reasonable security measures for their internal networks, or for systems and applications specifically focused on dealing with sensitive information. However, these entities also make it clear through privacy policies and contract language that the privacy of information dealt with be 'consumer-grade' services, such as SMS messaging, cannot be guaranteed.

The security controls associated with mobile phones, both in transmission and storage of SMS messages, will vary significantly based on the device used, user savvy, and the services and features offered by the carrier. Many carriers make reasonable security features available to users, such as encrypted transmission from the mobile phone to the carrier network, encryption of data stored on the mobile phone, and secure wiping of data from mobile phones in cases where unauthorized access is attempted. However, the availability of these features vary based on the type of device used, and may or may not be available from a given carrier even if supported by the device. Users may choose not to take advantage of such features due to lack of awareness or technical savvy, or simply due to complacency. Consumers are often driven by cost, convenience, and ease-of-use, rather than security and privacy, and therefore it is not reasonable to assume any baseline of security for mobile phone configuration and usage with regard to SMS messaging.

SMS messaging was developed, and is still primarily intended, for convenience rather than security and integrity. The nature and volume of communications involved dictate that protocols and methods be negotiated among multiple entities with a focus on expediency, and that the introduction of consistent security controls would greatly impede the ability of these entities to deliver the expected service and compete with their peers. The SMS infrastructure, and associated providers, constitutes a service that is analogous to the public Internet (although not yet as standardized in terms of protocols, routing methodologies, and technologies used). That is to say that SMS services offer varying security capabilities that can be utilized by businesses and consumers, and these security capabilities are constantly being advanced through the innovation of 3rd party technology companies and service providers. However, as with the public Internet, many of these security controls cannot be implemented by carriers and gateways for their entire user base without thwarting the basic intents of the service. Security controls for SMS messaging are only reasonably implemented in controlled environments, such as a private network or an organized collaborations of end-user device software/configurations to ensure safe message transmission across untrusted networks, and are to be considered unreliable once outside such controlled environments.

3.2.1 HIPAA Considerations

HIPAA establishes a number of security requirements for which SMS messaging represents, at best, a partially suitable platform for transmission of EPHI.

3.2.1.1 Compliance Challenges for Administrative Safeguards

Refer to section 2.3.1.1 for explanation of the requirements discussed.

- Standards for information security controls and risk management processes are not consistently implemented or maintained across entities involved in the transmission or storage of SMS messages.
- There is no reasonable means among carriers and gateways for specialized treatment of EPHI with regard to access and audit controls, or personnel management. In SMS messaging systems there is no reliable means of identification of EPHI, and therefore no reliable means of segregation of the data for the purpose of focusing security controls. This condition also makes fulfillment of the required terms for business associate agreements not feasible outside of a custom business arrangement.

3.2.1.2 Compliance Challenges for Physical Safeguards

Refer to section 2.3.1.2 for explanation of the requirements discussed.

- While the facilities that contain the core messaging and routing systems associated with SMS messaging are typically maintained in reasonable alignment with HIPAA requirements, there are deviations that cannot be reasonably managed- especially with regard to facilities in foreign countries, 3rd party providers, and communications infrastructure outside of controlled facilities.
- The nature of consumer-targeted wireless communications is such that network accessibility cannot be restricted to trusted areas without defeating the core intention of the service. This means that physical security controls cannot be used as a basis to overcome the security issues inherent in SMS communications.

3.2.1.3 Compliance Challenges for Technical Safeguards

Refer to section 2.3.1.3 for explanation of the requirements discussed.

- Appropriate encryption mechanisms cannot be feasibly implemented for the transmission of SMS messages across heterogeneous networks.
- Encryption of SMS messages stored on mobile phones cannot be feasibly managed across a disparate base of subscribers. It is also reasonable to assume that the volume of SMS messages dealt with by significant carriers is such that encryption of PHI data at rest at SMSCs, gateways, etc. is not feasible.
- Security controls such as authentication, session timeout, anomaly monitoring, and audit controls cannot be implemented across the board for

3.2.1.4 Strategies for HIPAA-Compliant SMS Messaging

It is clear that SMS messaging cannot be used outside of a controlled environment while enforcing the security controls required when dealing with EPHI. HIPAA allows for the de-identification of data by removal of the identifiers (see section 2.2.1), but the very act of sending it to an individual's mobile number essentially 're-identifies' the data by introducing the mobile number as an identifier. **The recommended approach is to make the message content itself carefully worded such that it communicates the intended information while containing no information about an individual’s health care condition, provisioning, or payment.** This is not always a straightforward matter. In some cases, even identifying the sender of the message can be interpreted as a HIPAA violation if an individual’s health information can be successfully inferred through the identity of the sender. Some strategies in this regard, in addition to generic message content are:

- Consider structuring the communications program such that messages are ‘coded’. This could be as simple as an agreed upon wording to convey certain information or using intentionally vague language.
- Consider messages directing individuals to retrieve detailed information in a secure web portal, or by calling the covered entity via phone. (Take care that the message content does not contain information that inadvertently reveals an individual’s health information, such as the web portal for a clinic, or phone number of a doctor, with a narrow specialization).

4 The Mobile Commons Solution

While Mobile Commons does not advocate the transmission of EPHI using SMS messaging, it is acknowledged that SMS messages will be sent by Mobile Commons clients based on health information, and that EPHI may likely need to be transmitted to, and stored on, Mobile Commons systems for this process to occur. **Mobile Commons understands its role as a business associate to covered entities in the context of HIPAA/HITECH, and has implemented security controls and associated processes that are appropriately aligned with the HIPAA requirements.**

4.1 Mobile Commons Security Controls

Mobile Commons has a comprehensive information security program in place that addresses the requirements set forth by HIPAA and HITECH, as well as other regulations and best-practice security standards*. For the purpose of this document, the security measures in place at Mobile Commons are discussed in the context of the HIPAA security requirements detailed in section 2.3 of this document.

**For a comprehensive description of the Mobile Commons Information Security Program, read our Security White Paper.*

4.1.1 Controls targeting Administrative Safeguards

Mobile Commons maintains a comprehensive set of information security policies, and has implemented procedures to ensure compliance with these policies. The elements of this program relevant to the HIPAA administrative safeguard requirements are as follows:

- Procedures are in place to monitor events from security monitoring systems, and regularly review audit logs from systems and applications, for malicious and anomalous activity. A structured incident response procedure is in place for the response to, containment of, and recovery from, security incidents.
- Regular security assessments are conducted to identify vulnerabilities, evaluate the associated threats, and assess the risk to sensitive client data, including EPHI.
- The Mobile Commons information security program includes measures to protect the confidentiality, integrity, and availability of sensitive client data, including EPHI. Additional measures are considered for implementation where appropriate based on the outcome of security assessments.
- Mobile Commons security policies include usage policies for employees that have access to, and/or deal with, sensitive client information, including EPHI. As a part of the security awareness and management program, these policies are reviewed with employees, and employee agreement with these policies is obtained, upon hire and on an annual basis thereafter. These policies include sanctions for non-compliance.
- A security officer designated with the responsibility of structuring the information security program, including all relevant policies and procedures, and overseeing its implementation. Corporate executive management is involved to maintain the appropriate level of focus in the organization on the information security program.
- Policies and procedures are in place to ensure that only authorized personnel are permitted access to sensitive client data, including EPHI. Only employees with a specific business-related need are granted such access, and the minimal level of access required to perform the required job function is granted.
- Formal procedures are in place to authorize, grant, modify, and revoke access to sensitive client data, including EPHI. Audit trails are maintained for the associated administrative activities.
- Technical controls are in place to ensure that sensitive client data, including EPHI, is effectively isolated from other client data, as well as from Mobile Commons personnel whose job role does not require access to the data.
- Redundancy, maintenance, backup and recovery systems and procedures are in place to ensure the availability of sensitive client data, including EPHI. These systems and procedures are tested regularly.
- Agreements are maintained with service providers and contractors access to Mobile Commons systems and information, to ensure that adequate security controls are in maintained for the entity

in question. Assessments are conducted as an additional assurance measure where deemed appropriate by the security officer.

4.1.2 Controls targeting Physical Safeguards

All Mobile Commons systems that transmit or store sensitive client information are housed in a secure data center facility that maintains a high standard of physical security controls. The following physical security controls in place relevant to the HIPAA physical safeguard requirements are as follows:

- Access to the data center facility is monitored 24x7 by onsite security personnel and video monitoring systems. Visitors to the facility must be pre-authorized, show identification, and sign a register. Visitors are escorted at all times when inside the data center facility.
- Systems that transmit and store sensitive client data, including EPHI, are in a secured area. Both keycard and biometric authorization is required for physical access to these systems.
- The data center facility maintains comprehensive security plans, access control procedures, maintenance plans, and contingency plans. Records for all such activities are maintained. These documents and processes are validated through at 3rd party SSAE16 audit on an annual basis.
- Change control processes are in place for the implementation, modification, or removal of any system on the production network. Procedures are in place for the secure disposal of systems and/or media that may contain sensitive information. Records are maintained for all of these processes.
- All employees and contractors are trained on the physical security measures, the associated access procedures, and their responsibilities in this regard.

4.1.3 Controls targeting Technical Safeguards

The Mobile Commons information security program includes comprehensive technical security measures geared towards protecting the confidentiality, integrity, and availability of sensitive client data, including EPHI. The technical security controls relevant to the HIPAA technical safeguard requirements are as follows:

- Authentication controls are in place for access to all systems and applications that deal with sensitive client data, including EPHI. All activity regarding access to, and transmission of, this data is logged. Sessions are configured to timeout after a period of inactivity.
- All sensitive data, including PHI and authentication credentials for system and application access, are transmitted via encrypted protocols (SSL or SSHv2) when traversing public or untrusted networks. Strong encryption is used for sensitive data stored on Mobile Commons systems.
- Multiple layers of procedures and technical controls are in place to verify the identity of any person or entity seeking access to any sensitive client information.
- All administrative, operational, and system anomaly activity associated with systems and applications that deal with sensitive data are logged to a central system for monitoring and analysis. Procedures are in place for the regular review of these log messages for inappropriate and/or anomalous activity and initiate response measures as appropriate.
- Technical controls are in place, including file integrity management, checksum functionality, and audit logging, to guard against the unauthorized modification of sensitive data either in transmission or storage.

4.2 SMS Security in the Mobile Commons Environment

Mobile Commons maintains a high standard of security for all of our applications, systems, and networks. However, as discussed at length in this document, SMS messaging of the scope and volume provided by Mobile Commons does not allow for security controls *outside* of our private technology environment.

Mobile Commons maintains secure connections with multiple SMS aggregators to facilitate messaging and communication with mobile carriers. All connections with SMS aggregators are maintained using VPN connections or SSL with strong encryption, and communications are restricted to the connectivity required to facilitate messaging.

4.3 The Mobile Commons Information Security Program

As Mobile Commons leverages innovative technology to facilitate modern communications between businesses and consumers, clients may need to entrust us with sensitive information to make use of our service. Mobile Commons takes this responsibility very seriously, and we maintain our information security program in alignment with commonly encountered regulations such as HIPAA and PCI-DSS as well as industry best practices. Our team makes a continual effort to stay educated on the regulatory requirements and security concerns that our clients experience, and our information security strategy is regularly updated to assist our clients with meeting their security goals while using our service.