

# IBM i 7.2 TR9 adds support for IBM Power System E980 servers and more

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## Overview

IBM<sup>(R)</sup> i 7.2 TR9 offers a major focus on support for the newly announced IBM Power<sup>(R)</sup> System E980 servers. This Technology Refresh includes some significant enhancements to IBM Db2<sup>(R)</sup> for i, IBM Rational<sup>(R)</sup> Developer for i, and IBM i Access Client Solutions (ACS), and adds some new open source environments.

### IBM Db2 for i

With IBM i 7.2 TR9, Db2 for i continues to focus on new and advanced SQL capabilities and the ability to use SQL to access IBM i operating system detail. Further, Db2 for i delivers a new capability for the database engineer to manage data description language (DDL).

### Licensed Program Products for IBM i

#### IBM i Access Client Solutions

The strategic interface for accessing and managing IBM i continues to be improved and enhanced. Version 1.8 includes many updates for the IBM i user as well as for the IBM i Db2 database engineer.

#### IBM Rational Developer for i

The strategic tooling for the IBM i application developer continues to be enhanced to help improve the productivity of your developers. One significant change to Rational Developer for i is the new PDM-like view.

### Open source

A greatly expanded suite of open source offerings enables easier application development and system administration. In addition, the installation and management of open source packages is now significantly easier.

### Hardware

#### IBM Power System E980 model 9080-M9S

The newly announced IBM Power System E980 servers continue the traditional focus on security and reliability, while also improving the handling of data-intensive and cloud workloads. I/O bandwidths have been greatly increased, allowing for greater throughput in a smaller footprint.

Unmap of thin-provisioned external storage

For native and NPIV-attached IBM Spectrum Virtualize™ configurations with IBM i that make use of thin provisioning, the IBM i operating systems has implemented the architected unmap function to allow the storage system to reuse space that has been freed by IBM i.

Multipath support for 3592-E05 and 3592-E06

Clients using older 3592-E05 and 3592-E06 drives in a TS3500 tape library can now take advantage of the tape multipath function that is already available for newer drive types. This enables the TS3500 with 3592-E05 and 3592-E06 drives to be attached to multiple redundant adapters and VIOS partitions for improved availability, and can also simplify the SAN management for a TS3500 tape library with multiple drive types.

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## Key prerequisites

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IBM i 7.2 TR9 is supported on selected IBM Power Systems™ servers:

- Power Systems servers with IBM POWER9™ technology-based processors
- Power Systems servers with IBM POWER8<sup>(R)</sup> technology-based processors
- Power Systems servers and blades and IBM Flex systems with IBM POWER7<sup>(R)</sup> or IBM POWER7 + processors
- Power Systems servers and blades with IBM POWER6<sup>(R)</sup> or IBM POWER6 + processors
- IBM System i<sup>(R)</sup> servers with POWER6 processors

For up-to-date information on all types of code levels needed for support of a particular feature, see the [IBM Power Systems Prerequisites](#) website.

See the [Technical information](#) section for specific hardware and software prerequisites.

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## Planned availability date

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September 14, 2018

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## Description

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Technical details for IBM i enhancements delivered with Technology Refresh 9 can be found on the IBM i developerWorks<sup>(R)</sup> Technology Updates wiki. This wiki contains information about IBM i enhancements, organized by subject matter.

To make it easy to find IBM i 7.2 TR9 specific enhancements, refer to the aggregated list of enhancements found on the following wiki landing page. Note that only a subset of IBM i 7.2 TR9 enhancements are delivered via the Technology Refresh PTF Group. Each category of enhancements contains details on how those enhancements are delivered.

The IBM i Technology Updates wiki in developerWorks contains details of IBM i operating system enhancements. To view technical details for the topics found in this announcement letter, see the [IBM i 7.2 TR9 enhancements](#) website.

### Db2 for i enhancements

Database application developers have new capabilities for constructing data-centric SQL solutions:

- Enhanced ILE RPG programming controls when using embedded SQL enables improved RPG programmer productivity when using SQL.

- Improved code generation for SQL procedures, functions, and triggers, yields improved performance when these objects are rebuilt.
- New and enhanced SQL built-in functions enable you to push more business logic into SQL statements.
- The IBM Toolbox for Java™ JTOpen JDBC driver offers capabilities to deploy highly available applications.

In the tradition of recent Technology Refreshes, IBM i Services are added and enhanced, enabling useful SQL-based alternatives to IBM i commands and APIs:

- The ACTIVE\_JOB\_INFO UDTF offers new optional input parameters and 70 new return columns. With these enhancements, administrators can more easily ask systems management-oriented questions using SQL.
- The JOB\_DESCRIPTION\_INFO view returns one row for each job description. This service adds to the set of work management topics that can be managed using SQL.

New capabilities are added for the database engineer:

- The QSYS2.GENERATE\_SQL\_OBJECTS() procedure is added as a Db2 for i provided database service. With this procedure, Db2 for i analyzes dependent objects to produce perfectly ordered generated SQL, enabling a significant productivity boost.
- Improved code generation for SQL procedures, functions, and triggers yields improved performance when these objects are rebuilt.
- New and enhanced SQL built-in functions helps to push more business logic into SQL statements.
- The IBM Toolbox for Java JTOpen JDBC driver offers new capabilities to deploy highly available applications.

These and other enhancements are delivered through Db2 PTF Group SF99703. See the [IBM i Technology Updates](#) wiki on developerWorks to learn more about all Db2 for IBM i enhancements.

To see the Db2 for i PTF Group details, go to the [Db2 for IBM i 2018 Group PTF Schedule](#) wiki.

## Licensed Program Products for IBM i

### IBM i Access Client Solutions

The strategic interface for accessing and managing IBM i continues to be improved and enhanced. A new updated version (1.8) includes many updates for the IBM i user as well as for the IBM i Db2 database engineer.

**Note:** To ensure compliance with the latest security recommendations, Access Client Solutions now requires a minimum of Java 8. The default Java version on your PCs should be updated to the latest version of Java 8, or later. Instructions on how to add a JRE to this deployment are in the [developerWorks](#) article (see sections "Optional JRE deployment" and "JRE deployment considerations").

5250 Emulator: Print support for 5250 has been significantly updated to support Java Print Service (JPS). Support within Access Client Solutions has been upgraded to support the following features:

- Characters per inch (CPI)
- Lines per inch (LPI)
- Page size
- Font size scaling (double-width, double-height, etc.)
- SBCS and DBCS (with Shift Out/Shift In) text
- Horizontal and vertical positioning
- Grid lines

- Barcodes
- Font
- Orientation (automatic, portrait, landscape)
- Scaling (fit-to-page or not)

**Note:** ASCII transparency (data intended to go directly to the printer) is not supported.

Open Source: IBM i Access Client Solutions has been enhanced with new interfaces for managing open source packages on IBM i. The new interface offers a simple way to install, remove, or update open source packages, both on the system as well as in a CHROOT container. Note that this tool leverages RPMs and does not require the 5733-OPS installed product (see the **Open source** section for more information).

Db2 database engineer: The database area within Access Client Solutions continues to be an area of focus. The following new features give Db2 engineers the tools they need to manage and maintain Db2 on i.

Schemas:

- Locked Rows (Table/Table Partition)
- Lock Holders (Alias/Index/Table/View)
- Cut/Copy/Paste (Table/Index)
- Table action to launch into Journal View Entries
- Change Schema Text
- Schema Properties
- SQL Package Properties
- Transactions
- Index and MQT partition lists

For the latest updates and access to the most recent version, see the [IBM i Access Client Solutions](#) page.

IBM Rational Developer for i

The strategic tooling for the IBM i application developer continues to be enhanced and improved, aimed at increasing developers' productivity. One significant change to Rational Developer for i for this release is the new PDM-like view. To continue to help developers using the SEU/PDM infrastructure, IBM has added a new way to interact with your code through Rational Developer for i. Here are some highlights of the major enhancements:

- The object table view is enhanced to make it easy for PDM users to migrate to Rational Developer for i while still using similar keystrokes and ways of working. It now boasts a PDM-like option column, for entering PDM options and user-defined commands and a PDM-like quick filter pane to quickly identify the items to work on. There is a rich history mechanism, enabling easy reuse of filter values. These filters can be named and used in the Remote Systems Explorer view. Many RSE power users may prefer to work in this enhanced table view because of its new ease and power.
- A PDM perspective is added that has more editor real estate and a minimal set of relevant views, and prominently features the object table for PDM-like file navigation. To help first-time users get started, they are automatically prompted for a simple hostname so they can get to work immediately. Together with the PDM perspective and enhanced object table view, this should give a streamlined Rational Developer for i on-boarding experience for users familiar with PDM.
- Support for the latest ILE RPG features, including the DATA-INTO opcode. DATA-INTO reads the data from a structured document, such as a JSON document, into a data structure. DATA-INTO is similar to XML-INTO, but you must provide a parser.

In addition to these major enhancements, many RFE requests have been fulfilled. For a complete list of all the updates and details on getting this new update, see the [Rational Developer for i Hub](#) site.

#### IBM Backup, Recovery and Media Service for i (5770-BR1)

Backup, Recovery and Media Services for i (BRMS) 7.2 and later has been enhanced with Independent Auxiliary Storage Pool (IASP) support and archive dynamic retrieval. IASP support enables BRMS to create virtual image catalog entries for backups in an IASP instead of using \*SYSBAS storage for cloud transfers using IBM Cloud Storage Solutions for i (5733-ICC). Archive dynamic retrieval provides the capability to retrieve archived data that is stored at a cloud location. Note that storing data in the cloud requires Cloud Storage Solutions for i.

#### IBM Cryptographic Device Manager for i (5733-CY3)

Cryptographic Device Manager for i (5733-CY3) is available as both an electronic download and on physical media. Prior to March of 2018, Cryptographic Device Manager was only available on physical media. Starting in March of 2018, the product, once ordered and an entitlement is created) is available to download from the [Entitled System Support \(ESS\)](#) web site.

Note that Cryptographic Device Manager is ordered via the e-configurator like the IBM i operating system and Licensed Program Products for IBM i.

### Open source

Many open source offerings are now available in RPM form. Large portions of the Linux<sup>®</sup> community use RPM-based packages to distribute software. A package manager (yum) is also included. With these changes, more open source technology can be made available, and the management and installation of these packages can be done in minutes.

Here are some examples of common tasks that can now be accomplished with the 'yum' command:

- yum list installed (list installed packages)
- yum list available (list available packages)
- yum list updates (list available updates to packages)
- yum install <package> (install a package)
- yum search <package> (search for a package)

For information on how to get started with these new RPM-based technologies, see the [IBM i Open Source](#) Git repository.

Language updates: Node.js version 8, Python version 3.6

As part of the RPM-based offering set, new language versions are available. Node.js version 8 and Python 3.6 both offer improved language features and performance.

**TLS 1.3 support:** As part of the RPM-based offering set, APIs and tools based on OpenSSL 1.1.1 are available. This brings TLS 1.3 capabilities to any technology that uses OpenSSL.

**nginx HTTP server:** Also, the nginx HTTP server has been built to take advantage of OpenSSL 1.1.1 and therefore TLS 1.3. This enables nginx to be a TLS 1.3-capable front end to virtually any web workloads.

**The 'updatedb' and 'locate' tools:** As part of the RPM-based offering set, the 'updatedb' and 'locate' utilities are available. This enables incredibly fast location of files on the system. The 'updatedb' command, when run, will populate a database with a list of files on the system. This takes several minutes and is often run on a nightly basis. After the database is populated, the 'locate' command can quickly find files whose filename or directory contains a given string.

**GNU tools:** As part of the RPM-based offering set, IBM delivers industry-standard GNU forms of many common commands. Some examples include the following:

- less
- grep
- ls
- awk
- sed
- find
- patch
- tar
- iconv
- sort

These commands enable improved compatibility with scripts, documentation, or products in the open source community.

**GNU C Compiler (GCC) and surrounding toolchain:** As part of the RPM-based offering set, GCC version 6.3.0 is available. Many tools that are often needed to build PASE or open source applications are also delivered. These include autoconf, automake, pkg-config, cmake, libtool, m4, and many more.

**LFTP:** As part of the RPM-based offering set, the LFTP utility is now available. LFTP is a sophisticated file transfer program. While it can serve as a command-line FTP utility, it understands a number of protocols including ftp, sftp, http, and others. It comes with a variety of features, such as the ability to create site mirrors or perform multiple tasks in parallel.

**GNU nano:** As part of the RPM-based offering set, the 'nano' editor enables easy editing of files within a terminal session. It supports usability features such as copy and paste and search and replace with regular expressions. It can also be extended to support syntax highlighting for several languages.

## Hardware

IBM Power System E980 model 9080-M9S

IBM i supports configurations with native-attached I/O, and those with VIOS for the new IBM Power System E980 model 9080-M9S.

I/O and storage support

In addition, this Technology Refresh includes hardware-related support for:

- VIOS configurations for NIC on the PCIe4 LP 2-port 100Gb ROCE EN IOA
- New 931GB, 1.86TB, and 3.72TB capacity solid-state drives (SSDs)

Unmap of thin-provisioned external storage

Support for the unmap function is implemented for IBM Spectrum Virtualize configurations with IBM i. This function is especially useful for thin provisioned configurations. The unmapping is done when a persistent object is deleted.

Multipath support for 3592-E05 and 3592-E06

Tape multipath support for additional devices 3592-E05 and 3592-E06 is included with the IBM i Technology Refresh PTF Group. However, for those who are not ready to move up to the latest Technology Refresh level, support is also provided via individual PTF IBM i 7.2 MF64644.

Additional information

For more information on the hardware-related announcements, see the [Hardware and Firmware](#) section of the Technology Updates wiki.

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## Product positioning

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IBM i 7.2 runs on a Power Systems server and offers a highly scalable and virus-resistant architecture with a proven reputation for exceptional business resiliency. Companies that run applications on i running on a Power server are able to focus on innovation and delivering new value to their business, not on managing their data center operations.

IBM i delivers a fully integrated and trusted combination of relational database, security, web services, networking, and storage management capabilities that are required to run business applications. For example, IBM installs and integrates the SQL standards-based Db2 database for i with advanced database management utilities, plus additional middleware components such as multiple file system options, directory capability, an HTTP web server that is powered by Apache, a web application server, and a web services environment.

IBM develops, fully tests, and preloads these core middleware components of i together. The preintegration and testing of i is a key factor in enabling companies to realize lower operations costs by deploying applications faster and maintaining them with less staff.

Virtualization and workload management are also built into the IBM i operating environment to enable businesses to consolidate and run multiple applications and components together on the same system, helping to drive up system usage and delivering a better return on IT investments. This broad and highly stable database and middleware foundation is ideal for efficiently deploying business processing applications.

### Architecture for simplicity, stability, and security

Another important advantage for i is the underlying architecture of the operating system, which enables simplicity, stability, and security. These are not add-on features, but inherent aspects of the operating system. Here are a few examples:

#### Simplicity

The relational database in i is an integrated component that is built on a set of integrated storage management capabilities unique to i and its predecessors. This storage management is based on the single-level storage architecture that treats all of the storage managed by i as one long stream of memory that encompasses the system memory and the storage on disks. This architecture makes it critical for the operating system to decide where to store any given piece of data, which removes the user from having to manage data placement. This method makes management of storage and the database objects contained in that storage significantly simpler.

#### Stability

IBM i architecturally separates the address spaces of user applications and the operating system, so it is difficult for poorly written or malicious software to intrude upon the underlying operating system support. This is one of several attributes that can help keep i running for days, weeks, and months without unexpected restarting of the operating system.

Several architectural attributes of i have contributed to the stability of the system over the years. First, applications compiled on i are compiled to a set of intermediate code instructions defined as the Technology Independent Machine Interface (TIMI). This enables i to fundamentally change the implementation of underlying hardware, firmware, and virtualization features, without requiring rewriting, changing, or even recompiling the applications written by users. This sort of forward compatibility can be a tremendous business advantage, and it enables the movement of software

developed and compiled several years to even decades before to run on later generations of the i operating system.

## Security

IBM i and its predecessors have an object-based architecture. Each entity on the system is an object, which has a set of prescribed operations that can be performed on it and connections from the object to those other objects that are allowed to perform various operations. An object that does not have a legal edit operation cannot be edited. It cannot be renamed to another kind of object. If the object does have an edit operation, known as *change* for most objects, it only has a defined set of attributes that can be edited, and then only by users who have authority to do that editing.

Objects can easily be hidden from other users by use of the library list objects, and security enhanced by the object-based security associated with all objects. And users who all have a similar role on the system can be grouped for role-based security, again as part of the base architecture of the system. While the i operating system supports Java, PHP, web services, and other open source programming methods, the underlying architecture offers a level of integration, stability, simplicity, and security that makes it significantly different from comparable operating systems. These aspects can deliver excellent business value to its users.

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## Reference information

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For more information on IBM Power System E980 see Hardware announcement [ZG18-0086](#), dated August 7, 2018.

For more information on IBM Power Systems Enhancements see Hardware announcement [ZG18-0077](#), dated August 7, 2018.

For more information on IBM i 7.3 TR5 see Software announcement [ZP18-0438](#), dated August 7, 2018.

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## Program number

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Program number	VRM	Program name
5770-SS1	7.2	IBM i 7.2 TR9
5733-CY3	7.2	Cryptographic Device Manager for i

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## Product identification number

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Not applicable

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## Offering Information

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Product information is available on the [IBM Offering Information](#) website.

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## Publications

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None

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## Services

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### Global Technology Services

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Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings for the efficient installation, implementation, or integration of this product.

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## Technical information

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### Specified operating environment

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#### **Hardware requirements**

A supported Power, Flex, or System i server or blade with a POWER9, POWER8, POWER7 +, POWER7, POWER6 +, or POWER6 processor is required to run IBM i 7.2 TR9.

For up-to-date information on all types of code levels needed for support of a particular feature, go to the [Power Systems Prerequisites](#) website.

#### **Software requirements**

To find the supporting technical details for the topics found in this announcement letter for IBM i 7.2, go to the [TR9 enhancements](#) website.

### Planning information

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#### **Packaging**

This offering is delivered through the internet and as physical media.

#### **Security, auditability, and control**

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These programs use the security and auditability features of the host hardware or software.

The client is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

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## Ordering information

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Consult your IBM representative.

<b>Program number</b>	<b>Feature description</b>	<b>Process option feature number</b>
5733-CY3	Electronic Delivery	3450

**Note:** Ordering 5733-CY3 will generate supply feature code 5819 unique to IBM i 7.2.

This software license includes Software Maintenance, previously referred to as Software Subscription and Technical Support.

#### **Charge metric**

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Not applicable

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## Terms and conditions

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This software license includes Software Subscription and Support (also referred to as Software Maintenance).

## **Software Maintenance**

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## **License Information number**

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## **Limited warranty applies**

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Yes

## **Limited warranty**

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## **Program support**

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## **Money-back guarantee**

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If for any reason you are dissatisfied with the program and you are the original licensee, you may obtain a refund of the amount you paid for it, if within 30 days of your invoice date you return the program and its PoE to the party from whom you obtained it. If you downloaded the program, you may contact the party from whom you acquired it for instructions on how to obtain the refund.

For clarification, note that for programs acquired under any of IBM's On/Off Capacity on Demand (On/Off CoD) software offerings, this term does not apply since these offerings apply to programs already acquired and in use by you.

### **Volume orders (IVO)**

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Yes. Contact your IBM representative.

### **Passport Advantage applies**

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No

### **Usage restrictions**

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See the [License Information documents](#) page on the IBM Software License Agreement website for more information.

### **Software Subscription and Support applies**

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Yes. All distributed software licenses include Software Subscription and Support (also referred to as Software Maintenance) for a period of 12 months from the date of acquisition, providing a streamlined way to acquire IBM software and assure technical support coverage for all licenses. Extending coverage for a total of three years from date of acquisition may be elected.

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### **IBM Operational Support Services - Support Line**

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Yes

### **System i Software Maintenance applies**

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Yes

### **Variable charges apply**

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No

### **Educational allowance available**

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Yes. When ordering through the program number process, a 15% education allowance applies to qualified education institution clients.

Education Software Allowance Program applies when ordering through the program number process.

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**ESAP available**

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Yes, to qualified clients.

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**Statement of good security practices**

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**Prices**

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Prices are subject to change without notice.

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**Announcement countries**

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