# Security Guide

Xerox® VersaLink B415 Multifunction Printer

Xerox® VersaLink C415 Multifunction Printer

Document Version: 1.0 (Mar 2023).

Changes are periodically made to this document. Changes, technical inaccuracies, and typographic errors will be corrected in subsequent editions.

## Revision History

| Version | Date | Details |
|---|---|---|
| **1.0** | **March 2023** | Xerox® VersaLink B415/C415 Initial version |

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# 1. Introduction

## Purpose

The purpose of this document is to disclose information for the Xerox® B415 and Xerox® C415 (referred to as “products” or “the system” in this document) with respect to product security. Product Security, for this paper, is defined as how image data is stored and transmitted, how the product behaves in a network environment, and how the product may be accessed both locally and remotely. The purpose of this document is to inform Xerox customers of the design, functions, and features of the product with respect to Information Assurance. This document does not provide tutorial level information about security, connectivity, or the product's features and functions. This information is readily available elsewhere. We assume that the reader has a working knowledge of these types of topics.

## Target Audience

The target audience for this document is Xerox field personnel and customers concerned with IT security.

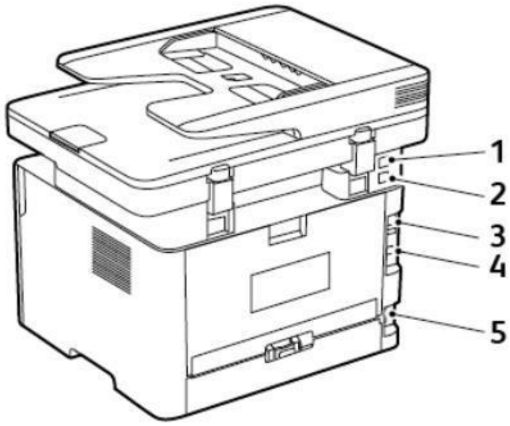
## Disclaimer

The content of this document is provided for information purposes only. Performance of the products referenced herein is exclusively subject to the applicable Xerox Corporation terms and conditions of sale and/or lease. Nothing stated in this document constitutes the establishment of any additional agreement or binding obligations between Xerox Corporation and any third party.

# 2. Product Description

## PHYSICAL COMPONENTS

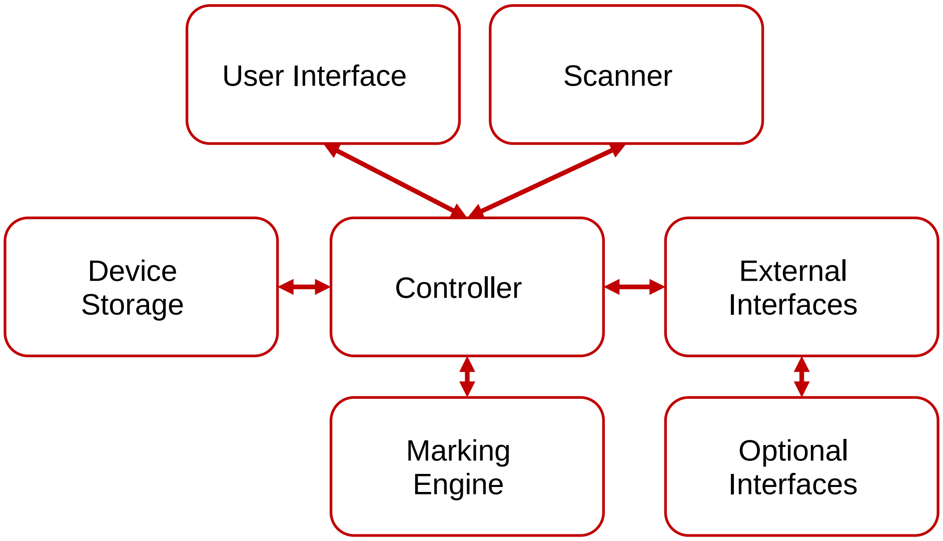
Xerox® B415 and C415 products consist of an input document handler and scanner, marking engine, controller, and user interface. A typical configuration is depicted below. Please note that options including paper trays, document handers, etc. may vary by configuration, however, they are not relevant to security and are not discussed.



1. EXT port
2. LINE port
3. Ethernet port
4. USB printer port
5. Power cord socket

## ARCHITECTURE

The products share a common architecture which is depicted below. The following sections describe components in detail.



## USER INTERFACE

The user interface detects soft and hard button actuations and provides text and graphical prompts to the user. The user interface is sometimes referred to as the Graphical User Interface (GUI) or Local User Interface (LUI), in order to distinguish it from the remote web server interface, also known as Embedded Web Server (EWS).

The user interface allows users to access product services and functions. Users with administrative privileges can manage the product configuration settings. User permissions are configurable through Role-Based Access Control (RBAC) policies, described in section 7 Identification, Authentication, and Authorization

## SCANNER

The scanner converts documents from hardcopy to electronic data. A document handler moves originals into a position to be scanned. The scanner provides enough image processing for signal conditioning and formatting. The scanner does not store scanned images.

## MARKING ENGINE

The Marking Engine performs copy/print paper feeding and transport, image marking, fusing, and document finishing. The marking engine is comprised of paper supply trays and feeders, paper transport, LED scanner, xerographics, and paper output and finishing. The marking engine is only accessible to the Controller via inter-chip communication with no other access and does not store user data.

### CONTROLLER

The controller manages document processing using proprietary hardware and algorithms to process documents into high-quality electronic and/or printed reproductions. Documents may be temporarily buffered in RAM during processing. Hard drives are not available on these products. For model specific details please see Appendix A: Product Security Profiles.

In addition to managing document processing, the controller manages all network functions and services. Details can be found in the Network Security section.

The controller handles all I/O communications with connected products. The following section provides a description of each interface. Please note that not all interfaces are supported on all models; details about each model can be found in Appendix A: Product Security Profiles.

## Controller External Interfaces

### FRONT/REAR PANEL USB (TYPE A) PORT(S)

One USB port may be located on the front of the product, near the user interface. Access to the front USB ports may be restricted based on user access. The front USB port can be fully disabled by a system administrator on these products. The front USB port supports the following:

- Walk-up users may insert a USB thumb drive to store or retrieve documents for scanning and/or printing from a FAT formatted USB device. The controller will only allow reading/writing of a limited set of known document types (such as, PDF, PNG, JPEG, TIFF, etc.). Other file types including binary executables are not supported.

  Note: Features that use the USB ports (such as Scan To USB) can be disabled independently based on user access control settings.
- Connection of optional equipment such as a human interface device (HID).
- Access can be permitted or restricted based on a defined schedule.
- Firmware updates may be submitted through the USB ports. Note that the product can be configured to restrict local firmware updates based on user access control settings.

### 10/100/1000 MB ETHERNET TIA-568 NETWORK CONNECTOR

This is a standard Ethernet network connector and confirms to IEEE Ethernet 802.3 standards.

### REAR USB (TYPE B) TARGET PORT

A USB type B port is located on the controller board at the rear of the product. This port supports the following:

- USB target connector used for printing

  **Note:** This port is used for service Diagnostics and cannot be disabled by a system administrator.

## Optional Equipment

### RJ-11 ANALOG FAX AND TELEPHONE

The embedded Fax service uses the installed embedded fax card to send and receive images over the telephone interface. The Fax card plugs into a custom interface slot on the controller. The Fax telephone lines are connected directly to the Fax card via RJ-11 connectors, and it uses T.30 Fax Modem protocol and will not accept data or voice communication. All remaining Fax-specific features are implemented in software on the controller.

### EXT PORT

Some devices come equipped with an EXT port that connects to the controller. The function of this port is to allow the customer to connect an additional device (telephone or answering machine) to the printer and the telephone line. In this configuration, the FAX card acts as a passive relay.

# 3. User Data Protection

Xerox ® Printers and multifunction products receive, process, and may optionally store user data from several sources including local print, scan, fax, or copy jobs, etc. All user data is temporarily stored in DRAM. These products do not contain hard drives.

## User Data Protection While Within Product

This section describes security controls that protect user data while it is resident within the product. For a description of security controls that protect data in transit please refer to the following section that discusses data in transit; also, the Network Security section of this document.

### NON-VOLATILE MEMORY WIPE

A non-volatile memory wipe erases a printer's- memory. volatile memory—EEPROM and NAND. These components store the device operating system, device settings, network information, various scanner settings and bookmark settings. No user-related print, copy or scan data is stored in non-volatile memory.

You can completely clear all printer, network, and shortcut settings on the device. This function is ideal when retiring, recycling, or removing a device from a secure environment.

NOTE: After all settings are removed or reset, network connectivity cannot be retained because the device is in the out-of-box shipping state. You are prompted to select either restarting the device with the out-of-box install wizard or leaving the printer in an offline state. There is no network connectivity until the device is restarted to ensure that the original ship configuration is maintained.

## User Data in Transit

This section focuses on the protection of user data (print/scan/other jobs) in transit as they are submitted to the product for processing and/or are sent from the product to other systems. Additional protections are also discussed in the Network Security section of this document.

### INBOUND USER DATA (PRINT JOB SUBMISSION)

In addition to supporting network level encryption including IPsec and WPA.

| Encrypted Transport | Description |
|---|---|
| IPPS (TLS) | Submit print jobs via Secure Internet Printing Protocol. This protocol is based on HTTP and utilizes the TLS suite to encrypt data. |
| HTTPS (TLS) | Securely submit a print job directly to product via the built-in web server. |
| Xerox Print Stream Encryption | Not supported on these products |

## EMAIL SIGNING AND ENCRYPTION USING S/MIME

S/MIME (Secure/Multipurpose Internet Mail Extensions) provides Authentication, Message integrity, Non-repudiation, and encryption of email.

| | | Xerox® B415 | Xerox® C415 |
|---|---|---|---|
| **Email S/MIME** | | | |
| | Versions | Not Supported | Not Supported |
| | Digest | Not Supported | Not Supported |
| | Encryption | Not Supported | Not Supported |

## SCANNING TO NETWORK REPOSITORYUSING S/MIME

S/MIME (Secure/Multipurpose Internet Mail Extensions) provides Authentication, Message integrity, Non-repudiation, and encryption of email.

| | | Xerox® B415 | Xerox® C415 |
|---|---|---|---|
| **Email S/MIME** | | | |
| | Versions | Not Supported | Not Supported |
| | Digest | Not Supported | Not Supported |
| | Encryption | Not Supported | Not Supported |

## SCANNING NETWORK REPOSITORY (OUTBOUND USER DATA)

The multifunction products support scanning of hardcopy documents to external network locations including file repositories and email and facsimile services. In addition to supporting network level encryption including IPSec, these products support the following.

| Protocol | Encryption | Description |
|---|---|---|
| HTTP | N/A | Unencrypted HTTP protocol |
| HTTPS (TLS) | TLS | HTTP encrypted by TLS |
| FTP | N/A | Unencrypted FTP |
| SFTP (SSH) | SSH | Not Supported |
| SMBv3 | Yes | Encryption may be enabled on a Windows share |
| SMBv2 | N/A | Unencrypted SMB |
| SMBv1 | N/A | (Not used as a transport protocol. Used for network discovery only) |
| SMTP (email) | N/A | The product uses SMTP to transmit data to the email server. Email encryption and signing are not supported. Please refer to the Network Security section of this document for details. |

### SCAN TO USER LOCAL STORAGE USB DEVICE (OUTBOUND USER DATA)

Scan data is transferred directly. File system encryption of the user's USB is not supported.

NOTE: TLS 1.0 and 1.1 are deprecated and considered insecure. Xerox recommends using TLS 1.2 or higher.

| | Xerox® B415 | Xerox® C415 |
|---|---|---|
| **Local Data Encryption** | Not supported | Not supported |
| Federal Information Protection Standard 140-2 | Yes | Yes |
| Media Sanitization NIST 800-171 (Image Overwrite) | No models are equipped with hard drive – therefore Not Supported | No models are equipped with hard drive – therefore Not Supported |
| **Print Submission** | | |
| IPPS (TLS) | Supported | Supported |
| HTTPS (TLS) | Supported | Supported |
| Xerox Print Stream Encryption | Not Supported | Not Supported |
| **Scan to Repository Server** | | |
| HTTPS (TLS) | 1.0, 1.1, 1.2 | 1.0, 1.1, 1.2 |
| SFTP (SSH) | Not supported | Not supported |
| SMB (unencrypted) | v1, v2, v3 | v1, v2, v3 |
| SMB (with share encryption enabled) | V3 | V3 |
| HTTP (unencrypted) | Supported | Supported |
| FTP (unencrypted) | Supported | Supported |
| **Scan to Fax Server** | | |
| HTTPS (TLS) | 1.0, 1.1.1, 1.2 | 1.0, 1.1.1, 1.2 |
| SFTP (SSH) | Not Supported | Not Supported |
| SMB (unencrypted) | v1, v2, v3 | v1, v2, v3 |
| SMB (with share encryption enabled) | V3 | V3 |
| S/MIME | Not Supported | Not Supported |
| HTTP (unencrypted) | Supported | Supported |
| FTP (unencrypted) | Supported | Supported |
| SMTP (unencrypted) | Supported | Supported |
| **Scan to Email** | | |
| S/MIME | Not Supported | Not Supported |
| SMTP (unencrypted) | Supported | Supported |
| TLS (StartTLS) | Supported | Supported |

### ADD ON APPS - CLOUD, GOOGLE, DROPBOX, AND OTHERS (OUTBOUND USER DATA)

Scan data is transferred directly. File system encryption of the user's USB is not supported.

# 4. Network Security

Xerox products are designed to offer a high degree of security and flexibility in almost any network environment. This section describes several aspects of the product related to network security.

## TCP/IP Ports and Services

Xerox devices are robust, offering support for a wide array of services and protocols. The devices are capable of hosting services as well as acting as a client for others. The diagram below presents a high-level overview of inbound communications (from other hosts on the network into listening services on the device) and outbound connections initiated by the device (acting as a client to external network services).

**Inbound (Listening Services)**

**Print Services**
LPR, IPPs (TLS), Raw IP, etc.

**Management Services**
SNMP, Web interface,
Web Services, etc.

**Infrastructure and Discovery Services**
IPsec, WSD, mDNS,
Bonjour, etc.

**Outbound (Network Client)**

**Built-in Scan Services**
FTP, HTTP & HTTPS (TLS), SMB,
SMTP & SMTPS, POP3, etc.

**Authentication Services**
LDAP & LDAPS, SMB, Kerberos

**Infrastructure**
IPsec, DHCP and
DHCPv6, etc.

### LISTENING SERVICES (INBOUND PORTS)

The following table summarizes all potentially open ports on the product. These ports can be enabled/disabled within the product configuration. Some ports can be configured to different value for some features/protocols.

| Port | Type | Service Name |
|---|---|---|
| 80<br>443 | TCP | HTTP<br>HTTPS |
| 137 | UDP | WINS |
| 161 | UDP | SNMP |
| 162 | UDP | SNMP Trap |
| 515 | TCP | LPR/LPD |
| 631 | TCP | IPP |
| 5353 | UDP | mDNS |
| 9100 | TCP | Raw IP (also known as JetDirect, AppSocket or PDL-datastream) |
| 9200 | UDP | Discovery |
| 9300<br>9301<br>9302 | UDP | Remote Management |
| 9400 | TCP | Enhanced Print Port |
| 9500<br>9501 | TCP | Remote Management |
| 3702 | UDP | WS –Discovery |
| 65001 | TCP | WS –Discovery |
| 65002 | TCP | WSD –Print Service |
| 65003 | TCP | WS –Eventing |
| 65004 | TCP | WSD –Scan Service |

## Network Encryption

### IPSEC

Internet Protocol Security (IPsec) is a network security protocol capable of providing encryption and authentication at the packet level. These products support IPsec for both IPv4 and IPv6 protocols.

NOTE: SHA1, AES128, and AES192 are deprecated and considered insecure. Xerox recommends using SHA256 and AES256 and above.

|  |  | **Xerox® B415** | **Xerox® C415** |
|---|---|---|---|
| **IPsec** |  |  |  |
|  | Supported IP Versions | IPv4, IPv6 | IPv4, IPv6 |
|  | Key exchange authentication method | Preshared Key & digital signature authentication (device authentication certificate, server validation certificate) | Preshared Key & digital signature authentication (device authentication certificate, server validation certificate) |
|  | Transport Mode | Transport & Tunnel mode | Transport & Tunnel mode |
|  | Security Protocol | ESP & AH | ESP & AH |
|  | ESP Encryption Method | AES, Null | AES, Null |
|  | ESP Authentication Methods | SHA1, SHA256, None | SHA1, SHA256, None |

### WIRELESS 802.11 WI-FI PROTECTED ACCESS (WPA)

Products equipped with WiFi support WPA2 Personal, WPA2 Enterprise, and Mixed Mode compliant with IEEE 802.11i. The wireless network adapters used in Xerox products are certified by the Wi-Fi Alliance.

NOTE: SHA1, AES128, and AES192 are deprecated and considered insecure. Xerox recommends using SHA256 and AES256 and above.

|  |  | **Xerox® B415** | **Xerox® C415** |
|---|---|---|---|
| **Wi-Fi (802.11)** |  |  |  |
|  | No Encryption | Supported | IPv4, IPv6 |
|  | WEP | RC4 | Preshared Key & digital signature authentication (device authentication certificate, server validation certificate) |
|  | WPA2 Personal (PSK) | AES | Transport & Tunnel mode |
|  | WPA2 Enterprise | EAP-MD5 | ESP & AH |
|  |  | EAP-MS-CHAPv2 | AES, Null |
|  |  | LEAP | SHA1, SHA256, None |
|  |  | PEAP |  |
|  |  | EAP-TLS |  |
|  |  | EAP-TTLS-CHAP |  |

| | | | |
|---|---|---|---|
| | | EAP-TTLS-MSCHAP | |
| | | EAP-TTLS-MSCHAPv2 | |
| | | EAP-TTLS-PAP | |
| | BSSID Roaming Restriction | Supported | |

### TLS

These products support the latest version, TLS 1.0, TLS 1.1, and TLS 1.2. TLS 1.0 and TLS 1.1 can be independently disabled via the EWS. TLS 1.2 is always supported and cannot be disabled.

NOTE: TLS 1.0 and 1.1 are deprecated and considered insecure. Xerox recommends using TLS 1.2 or higher.

| | | Xerox® B415 | Xerox® C415 |
|---|---|---|---|
| TLS | | | |
| | TLS Versions | TLS 1.2 (recommended)<br>TLS 1.0, TLS 1.1 and TLS 1.2 (default)<br>TLS 1.1 and TLS 1.1 can be independently turned off | TLS 1.2 (recommended)TLS 1.0, TLS 1.1 and TLS 1.2 (default)<br>TLS 1.1 and TLS 1.1 can be independently turned off |
| | TLS Hash Algorithms | SHA-256 and above (recommended)<br>SHA-1, SHA-256 and above (default) | SHA-256 and above (recommended)<br>SHA-1, SHA-256 and above (default) |

### SNMPV3

SNMPv3 is the current standard version of SNMP defined by the Internet Engineering Task Force (IETF). It provides three important security features:

- Message integrity to ensure that a packet has not been tampered with in transit
- Authentication to verify that the message is from a valid source
- Encryption of packets to prevent unauthorized access

NOTE: SHA1, AES128, and AES192 are deprecated and considered insecure. Xerox recommends using SHA256 and AES256 and above.

| | | Xerox® B415 | Xerox® C415 |
|---|---|---|---|
| SNMPv3 | | | |
| | Digest | SHA1, MD5 | SHA1, MD5 |
| | Encryption | DES, AES128 | DES, AES128 |

## Public Key Infrastructure (PKI)

Digital certificates are a key component of public key infrastructure. A digital certificate contains information about the identity of an entity, the certificate authority that issued the certificate, and its associated public and private key pair. The certificate’s private key is used to generate digital signatures, and the public key is used to validate those digital signatures. For entities to validate a digital signature, the certificate and its public key are shared freely. Trust is established by validating the certificate path, which contains the certificate authorities that issued the certificate.

### DEVICE CERTIFICATES

These products support both CA signed and self-signed device certificates. The products can accept certificates with a bit length of up to 4096 bits.

The device has a self-generated default device certificate by which the device can be uniquely identified. Device generated certificates use SHA256/RSA2048, however the products can accept certificates for lower/higher key/hash lengths.

| | | **Xerox® B415** | **Xerox® C415** |
|---|---|---|---|
| **Device Certificates** | | | |
| | Certificate Length | Up to 4096 (for RSA certificates) | Up to 4096 (for RSA certificates) |
| | Default Device Certificate | SHA256/RSA2048 | SHA256/RSA2048 |
| | Supported Hashes | SHA256 | SHA256 |
| | Product Web Server | Supported | Supported |
| | IPPS Printing | Supported | Supported |
| | 802.1X Client | Supported | Supported |
| | IPsec | Supported | Supported |
| | SFTP | Not Supported | Not Supported |

### TRUSTED CERTIFICATES

Public Root and Intermediate Root Certificate Authority (CA) certificates may be imported to the product’s certificate store to establish trust with external products and services. The following categories are supported:

- A Root CA certificate is a certificate with authority to sign other certificates. These certificates usually are self-signed certificates that come from another product or service that you want to trust.
- An Intermediate CA certificate is a certificate that links a certificate to a Trusted Root CA Certificate in certain network environments.

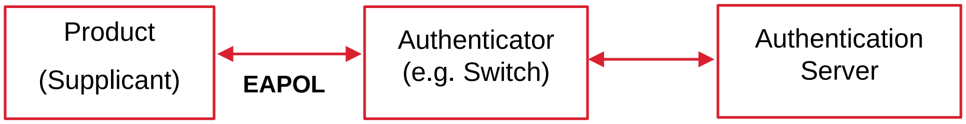
NOTE: SHA1, AES128, and AES192 are deprecated and considered insecure. Xerox recommends using SHA256 and AES256 and above.

| | | **Xerox® B415** | **Xerox® C415** |
|---|---|---|---|
| **Trusted Certificates (CA & Peer device)** | | | |
| | Minimum Length RSA Restriction Options | None, 1024, 2048 | None, 1024, 2048 |
| | Maximum Length | 4096 | 4096 |
| | Supported Hashes | SHA1/224/256/384/512 | SHA1/224/256/384/512 |
| | IPsec | Supported | Supported |
| | LDAP | Supported | Supported |
| | Scanning (HTTPS/TLS) | Supported | Supported |
| | Scanning (SFTP/SSH) | Not Supported | Not Supported |
| | 802.1X Client | Supported | Supported |
| | Email Signing | Not Supported | Not Supported |
| | Email Encryption | Not Supported | Not Supported |
| | Email (STARTLS) | Not Supported | Not Supported |
| | OCSP Signing | Not Supported | Not Supported |

## Network Access Control

### 802.1X

In 802.1X authentication, when the product is connected to the LAN port of Authenticator such as the switch as shown below, the Authentication Server authenticates the product, and the Authenticator controls access of the LAN port according to the authentication result. The product starts authentication processing at startup when the startup settings for 802.1X authentication are enabled.



| | | | |
|---|---|---|---|
| **Network Access Control** | | | |
| | 802.1x | Supported | Supported |
| | Authentication Methods | LEAP, PEAP, EAP-MD5, EAP-MSCHAPv2, EAP-TLS, EAP-TTLS (with the following authentication methods: CHAP, MSCHAP, MSCHAPv2, PAP) | LEAP, PEAP, EAP-MD5, EAP-MSCHAPv2, EAP-TLS, EAP-TTLS (with the following authentication methods: CHAP, MSCHAP, MSCHAPv2, PAP) |

### CISCO IDENTITY SERVICES ENGINE (ISE)

Cisco ISE is an intelligent security policy enforcement platform that mitigates security risks by providing a complete view of which users and what products are being connected across the entire network infrastructure. It also provides control over what users can access your network and where they can go. Cisco's ISE includes over 200 Xerox product profiles that are ready for security policy enablement. This allows ISE to automatically detect Xerox products in your network. Xerox products are organized in Cisco ISE under product families, such as VersaLink® products, enabling Cisco ISE to automatically detect and profile new Xerox products from the day they are released. Customers who use Cisco ISE find that including Xerox products in their security policies is simpler and requires minimal effort.

Cisco ISE Profiling Services provides dynamic detection and classification of endpoints connected to the network. ISE collects various attributes for each network endpoint to build an endpoint database. The classification process matches the collected attributes to prebuilt or user-defined conditions, which are then correlated to an extensive library of product profiles. These profiles include a wide range of product types, including tablets, smartphones, cameras, desktop operating systems (for example, Windows®, Mac OS® X, Linux® and others), and workgroup systems such as Xerox printers and MFPs.

Once classified, endpoints can be authorized to the network and granted access based on their profile signature. For example, guests to your network will have different level of access to printers and other end points in your network. As an example, you and your employees can get full printer access when accessing the network from a corporate workstation but be granted limited printer access when accessing the network from your personal Apple® iPhone®.

Cisco ISE allows you to deploy the following controls and monitoring of Xerox products: Automatically provision and grant network access rights to printers and MFPs to prevent inappropriate access (including automatically tracking new printing products connecting to the network):

- Block non-printers from connecting on ports assigned to printers
- Prevent impersonation (aka spoofing) of a printer/MFP
- Automatically prevent connection of non-approved print products
- Smart rules-based policies to govern user interaction with network printing products

Provide simplified implementation of security policies for printers and MFPs by:

- Providing real time policy violation alerts and logging
- Enforcing network segmentation policy
- Isolating the printing products to prevent general access to printers and MFPs in restricted areas

Automated access to policy enforcement

- Provide extensive reporting of printing product network activity

| | | **Xerox® B415** | **Xerox® C415** |
|---|---|---|---|
| **Network Access Control** | | | |
| | Cisco ISE | Supported | Supported |

### CONTEXTUAL ENDPOINT CONNECTION MANAGEMENT

Traditionally network connection management has been limited to managing endpoints by IP address and use of VLANs and firewalls. This is effective, but highly complex to manage for every endpoint on a network. Managing, maintaining, and reviewing the ACLs (and the necessary change management and audit processes to support them) quickly become prohibitively expensive. It also lacks the ability to manage endpoints contextually.

Connectivity of these devices can be fully managed contextually by Cisco TrustSec. TrustSec uses Security Group Tags (SGT) that are associated with an endpoint’s user, device, and location attributes. SG-ACLs can also block unwanted traffic so that malicious reconnaissance activities and even remote exploitation from malware can be effectively prevented.

### FIPS140-2 COMPLIANCE VALIDATION

The products leverage a FIPS 140-2 (Level 1) compliant cryptographic module used for user space cryptographic functions including, key management, hashing, symmetric and asymmetric cryptography.

## Additional Network Security Controls

### IP FILTERING

The devices contain a static host-based firewall that provides the ability to prevent unauthorized network access based on IP address.

These devices can be configured to allow TCP/IP connections only from a specified list of TCP/IP addresses. This blocks all TCP connections from other addresses, protecting the device against unauthorized printing and configuration. These devices support TCP connection filtering with the Restricted Server List field. By using this option, the device can accept only previously specified TCP/IP connections and rejects all others.

The restricted server list allows up to 50 IP addresses or subnets to be specified. The device responds normally to any address in the list and rejects TCP connections to any address that is not on the list. The products can be further configured to restrict the allowed IP Addresses to Block All Ports, Block Printing Only, or Block Printing and HTTP Only.

The restricted server list does not affect UDP traffic, and so connectionless interactions, such as ping, are allowed from any address.

### PERSONAL IDENTIFIABLE INFORMATION (PII)

Personal Identifiable Information (PII) can be entered or stored into the device through several means: address book, bookmarks, device description, display device information, and engineering logs. The PII is stored in Non-Volatile memory and it is not readable outside of the operation of the device.

# 5. Device Security: BIOS, Firmware, OS, Runtime, and Operational Security Controls

These products have robust security features that are designed to protect the system from a wide range of threats. Below is a summary of some of the key security controls.

## Pre-Boot Security

### BIOS

The embedded BIOS used in these products cannot be accessed by users. Unlike devices such as desktop and laptop computers that have a BIOS that can be accessed via a keystroke on startup, the BIOS of these products is not accessible.

Many devices can be cleared to factory defaults (including passwords and security settings) by depressing a reset button using a paperclip or similar method. For security reasons, These products do not offer such a method to clear or reset the BIOS. (Note that configuration settings may be reset to factory defaults by an authorized administrator, however, this does not impact BIOS settings).

BIOS updates can be securely applied by device firmware updates. Firmware is protected from tampering by use of digital signatures (discussed later in this section).

The BIOS is designed to fail secure. An integrity check is performed immediately when power is applied. If verification is successful, the system proceeds with OS kernel boot. If the integrity check fails, the system will fail secure.

## Boot Process Security

### TRUSTED BOOT

The chain-of-trust process on these products to check and operating system during startup, normal operation and execution of an internal application is defined in the following list. If any of the following tests fail, the device halts operation of all processes and reports an error.

- The device’s physical hardware is used to valid used to verify the signature on the kernel.
- The kernel is then used to verify the signatures on each firmware flash partition before it is mounted by the device.
- Internal device drivers and executable code are designed to be operated on trusted read-only flash partitions.
- Each time a block is paged from the trusted flash memory to RAM, its hash value is verified by the kernel, which provides continuous verification and tamper detection.

### FIRMWARE INTEGRITY

Unlike open operating systems such as servers and user workstations in which software may be installed by users, Xerox products are based on embedded systems and the contents are managed by Xerox. The only means of modifying the contents of a device is by applying a firmware update package.

Firmware updates use a special format and each firmware update is encrypted and digitally signed to protect the integrity of the contents. Firmware that is corrupt or has been illicitly modified will be rejected. This security control cannot be disabled. These products include a built-in firmware software validation. This is a file integrity monitor that compares the security hashes of currently installed firmware to a secured whitelist that was installed when the signed firmware was installed.

## Runtime Security

McAfee Embedded Control is not supported on these devices.

## Operational Security

### FIRMWARE RESTRICTIONS

The list below describes supported firmware delivery methods and applicable access controls.

- **Local Firmware Upgrade via USB port:**
  Xerox service technicians can update product firmware using a USB port and specially configured USB thumb drive.
- **Network Firmware Update:**
  Product system administrators can update product firmware using the Embedded Web Server. The ability to apply a firmware update is restricted to roles with system administrator or Xerox service permissions. Firmware updates can be disabled by a system administrator.
- **Xerox Remote Services Firmware Update:**
  Xerox Remote Services can update product firmware securely over the internet using HTTPS. This feature can be disabled, scheduled, and includes optional email alerts for system administrators.

For additional information on Firmware updates and various upgrade methods supported, please see the System Administrator Guide.

## Event Monitoring and Logging

### AUDIT LOG

These products do not support Audit Logging.

## Operational Security

### CLONING (IMPORT/EXPORT CONFIGURATION)

Certain system settings can be captured in a clone are the same model. Clone files are not encrypted and have the potential to contain sensitive information depending on which product feature setting is selected. Access to both creating (exporting) and applying (importing) a clone file can be restricted using user access controls. Clone files can only be created and applied through the Embedded Web Server.

### BACKUP AND RESTORE (IMPORT/EXPORT CONFIGURATION)

Like cloning, backup & restore, can capture (copy) certain system and device specific settings in a backup file. This file may be reapplied to the same device at any time. Refer to the Cloning section above.

### EIP APPLICATIONS

These products do not support EIP Applications.

# 6. Configuration and Security Policy Management Solutions

Xerox Device Manager and Xerox® CentreWare® Web (available as a free download) centrally manage Xerox Devices. For details, please visit Xerox.com or speak with a Xerox representative.

# 7. Identification, Authentication, and Authorization

These products offer a range of authentication and authorization options to support various environments.

Single Factor authentication is supported locally on the product or via external network authentication servers (e.g., LDAP, Kerberos, ADS). Multi Factor authentication is supported by addition of card reader hardware. (Where ease of access is desired, open access and simple user identification modes also exist, however, these are not recommended for secure environments.)

A flexible RBAC (Role-Based Access Control) security model enables granular control to assign user permissions. Once a user has been authenticated, the product grants (or denies) user permissions based upon the role(s) they have been assigned to. Pre-defined roles that may be used or custom roles may be created as desired.

## Authentication

These devices support the following authentication mode:

- Local Authentication
- Network Authentication

### LOCAL AUTHENTICATION

The local user database stores user credential information. The printer uses this information for local authentication and authorization, and for Xerox Standard Accounting. When you configure local authentication, the printer checks the credentials that a user provides against the information in the user database. When you configure local authorization, the printer checks the user database to determine which features the user is allowed access.

**Note:** User names and passwords stored in the user database are not transmitted over the network and passwords are encrypted.

### PASSWORD POLICY

The following password attributes can be configured:

| Password Policy | |
|---|---|
| **Minimum Length** | 1 |
| **Maximum Length** | 32 |

All newly sold devices are shipped without an Admin account. The product Install Wizard requests that the user create an Admin account and assign a password as a part of the install process. This step can be skipped.

### NETWORK AUTHENTICATION

When configured for network authentication, user credentials are validated by a remote authentication server.

| Network Authentication Providers | |
|---|---|
| **Kerberos (Microsoft Active Directory)** | Supported |
| **Kerberos (MIT)** | Supported |
| **SMB NTLM Versions Supported** | NTLMv2 |
| **LDAP Versions Supported** | Version 3 (including TLS 1.2) |

### SMART CARD AUTHENTICATION

Smart Card authentication is not supported for these products.

| Smart Cards | |
|---|---|
| **Common Access Card (CAC)** | Not Supported |
| **PIV/ PIV II** | Not Supported |
| **Gemalto MD** | Not Supported |
| **SIPR** | Not Supported |

### CONVENIENCE AUTHENTICATION

Convenience is not supported for these products.

## Authorization (Role-Based Access Controls)

These products offer granular control of user permissions. Users can be assigned to a pre-defined Admin role or customers may design highly flexible custom permissions (groups).

Permissions are broken up into three main categories: Functional Access, Administrative Menus, and Device Management. Security access controls can be disabled in the Administrative Menu category.

# 8. Additional Information and Resources

## Security @ Xerox®

Xerox maintains an evergreen public web page that contains the latest security information pertaining to its products. Please see https://www.xerox.com/security

## Responses to Known Vulnerabilities

Xerox has created a document which details the Xerox Vulnerability Management and Disclosure Policy used in discovery and remediation of vulnerabilities in Xerox software and hardware. It can be downloaded from this page: https://www.xerox.com/information-security/information-security-articles-whitepapers/enus.html

## Additional Resources

Below are additional resources.

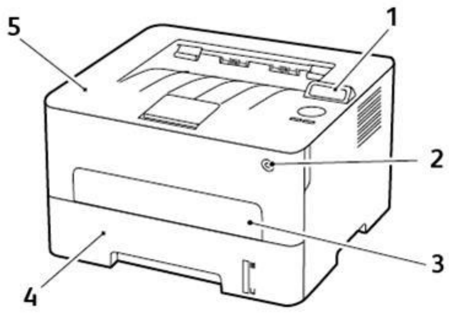
| Security Resource | URL |
|---|---|
| Frequently Asked Security Questions | https://www.xerox.com/en-us/information-security/frequently-asked-questions |
| Common Criteria Certified Products | https://security.business.xerox.com/en-us/documents/common-criteria/ |
| Current Software Release Quick Lookup Table | https://www.xerox.com/security |
| Bulletins, Advisories,<br>and Security Updates | https://www.xerox.com/security |
| Security News Archive | https://security.business.xerox.com/en-us/news/ |

# 9. Appendix A: Product Security Profiles

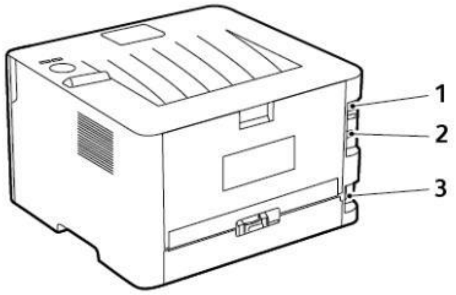
This appendix describes specific details of product.

## Xerox® B415 Multifunction Printer

### PHYSICAL OVERVIEW



1. Control Panel
2. Power button
3. Manual Feeder
4. 250–sheet Tray
5. Standard Bin



1. Ethernet port
2. USB printer port
3. Power cord socket

### SECURITY RELATED INTERFACES

| Security Related Interfaces | |
|---|---|
| **Ethernet** | 10/100 Base TX Ethernet interface. |
| **Rear USB 3.0 (Type B)** | USB target connector used for printing.<br>Note: This port can be disabled completely by a system administrator. |
| **Front USB2.0 (Type A) port(s)** | N/A |

## CONTROLLER NON-VOLATILE STORAGE

| | IC | HDD | SSD | SD Card |
|---|---|---|---|---|
| | **Yes** | **N/A** | **N/A** | **N/A** |
| **Contains User Data (e.g., Print, Scan, Fax)** | No | N/A | N/A | N/A |
| **Encryption Support** | N/A | N/A | N/A | N/A |
| **NIST 800-171 Overwrite Support** | N/A | N/A | N/A | N/A |
| **Contains Configuration Settings** | Yes | N/A | N/A | N/A |
| **Encryption Support** | N/A | N/A | N/A | N/A |
| **Customer Erasable** | Erase Printer Memory | N/A | N/A | N/A |

IC- Integrated Circuit, soldered to circuit board

HDD- Magnetic Hard Disk Drive

SSD- Solid State Disk

SD Card- Secure Digital Card

## CONTROLLER VOLATILE MEMORY

| Model | Size | Type | Use | User Data | How to Clear |
|---|---|---|---|---|---|
| B415 | 256 MB | DDR3 DRAM | Executable code, Printer control data, temporary storage of job data | Yes | Power off system |

## MARKING ENGINE NON-VOLATILE STORAGE

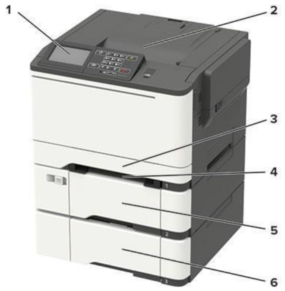
The marking engine does not contain any non-volatile storage.

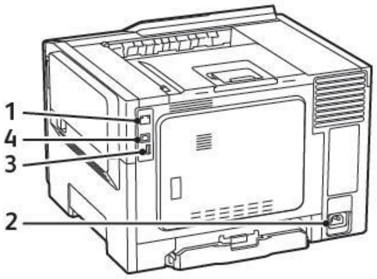
## MARKING ENGINE VOLATILE MEMORY

The marking engine volatile memory does not store or process user data.

## Xerox® C415 Printer

### PHYSICAL OVERVIEW





1. Control panel
2. Standard Bin
3. Standard 250-sheet tray
4. Manual Feeder
5. Optional 650-sheet duo tray
6. Optional 550-sheet tray

1. Ethernet port
2. Power cord socket
3. USB port
4. USB printer port

### SECURITY RELATED INTERFACES

| Security Related Interfaces | |
|---|---|
| **Ethernet** | 10/100 Base TX Ethernet interface. |
| **Rear USB 3.0 (Type B)** | USB target connector used for printing.<br>Note: This port can be disabled completely by a system administrator. |
| **Front USB2.0 (Type A) port(s)** | Users may insert a USB thumb drive to print from or store scanned files to. (Physical security of this information is the responsibility of the user or operator.) Note that features that leverage USB ports (such as Scan To USB) can be disabled independently based on services.<br>Firmware upgrades may be applied using this port.<br>Note: This port cannot be disabled completely. |

### CONTROLLER NON-VOLATILE STORAGE

| | IC | HDD | SSD | SD Card |
|---|---|---|---|---|
| | **Yes** | **N/A** | **N/A** | **N/A** |
| **Contains User Data (e.g., Print, Scan, Fax)** | No | N/A | N/A | N/A |
| **Encryption Support** | N/A | N/A | N/A | N/A |
| **NIST 800-171<br>Overwrite Support** | N/A | N/A | N/A | N/A |
| **Contains Configuration Settings** | Yes | N/A | N/A | N/A |
| **Encryption Support** | N/A | N/A | N/A | N/A |
| **Customer Erasable** | Erase Printer Memory | N/A | N/A | N/A |

IC- Integrated Circuit, soldered to circuit board

HDD- Magnetic Hard Disk Drive

SSD- Solid State Disk

SD Card- Secure Digital Card

### CONTROLLER VOLATILE MEMORY

| Model | Size | Type | Use | User Data | How to Clear |
|---|---|---|---|---|---|
| C415 | 1 GB | DDR3 DRAM | Executable code, Printer control data, temporary storage of job data | Yes | Power off system |

### MARKING ENGINE NON-VOLATILE STORAGE

The marking engine does not contain any non-volatile storage.

### MARKING ENGINE VOLATILE MEMORY

The marking engine volatile memory does not store or process user data.