White Paper

Brother Cloud MPS

26 November 2018

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Using this document

This Brother White Paper is intended for customers who wish to know a little more about communication between their Brother machine and Brother's cloud infrastructure. It contains technical information about how a Brother machine communicates directly with Brother's machine information collection service and how this service communicates with Brother's machine management service.

1 Background

1.1 What is Brother Cloud MPS?

Brother Cloud MPS is a web service developed by Brother International Europe and Brother Industries Limited that provides a managed print solution for Brother network- and USB-connected machines.

- **Network-connected machines**
  Network-connected machines communicate directly with the Cloud. No additional software needs to be installed.

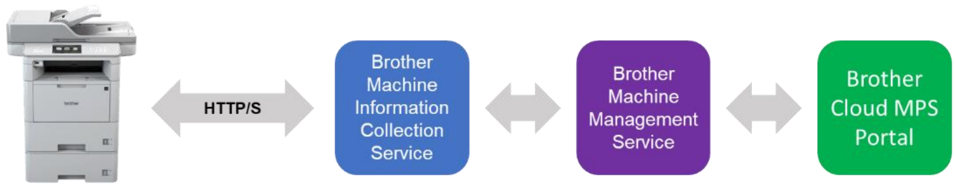


Figure 1: Brother Cloud MPS system elements (network-connected machines)

- **USB-connected machines**
  USB-connected machines communicate to a Data Collection Agent (DCA) called BOAgent. BOAgent runs on a Windows platform and must be installed on the PC that is communicating with the Brother machine that is part of the MPS contract.

  The DCA passes machine information to the Brother Cloud MPS via Brother's machine information collection server and Brother's machine management server. The DCA uses PJL commands to collect information from a USB-connected Brother machine.

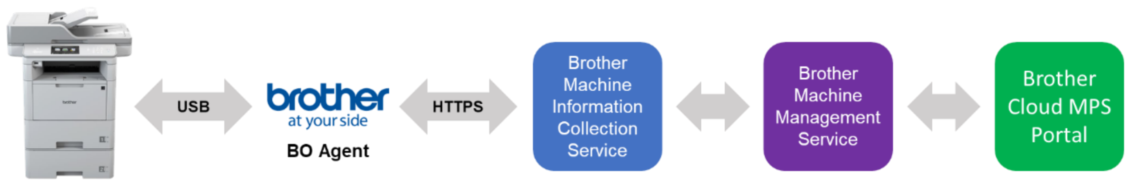


Figure 2: Brother Cloud MPS system elements (USB-connected machines)

1.2 Brother Cloud MPS Portal

Approved Brother channel partners access the Brother Cloud MPS portal via Brother Online. The channel partner visits the relevant country Brother Online website. When they log on, they are then able to enter the Brother Cloud MPS portal.

Brother channel partners have the option of three different versions of the Brother Cloud MPS Portal. Each version of the portal has different features and configuration to give a range of Brother dealers the tools and functionality they need to create print services for their customer. Local Offices can choose to give resellers access to the Brother Cloud MPS reseller portals that fit the resellers need. The three versions of the portal are:

- Brother MPS
- Brother MPS+
- Partner MPS CPP

The version of the portal that the reseller uses to create an MPS contract will impact on the interface and function that the end customer and local office will have when they log into the end-customer MPS portal or the LO administration portal.

Users access the Brother Cloud MPS portal using the HTTPS protocol.

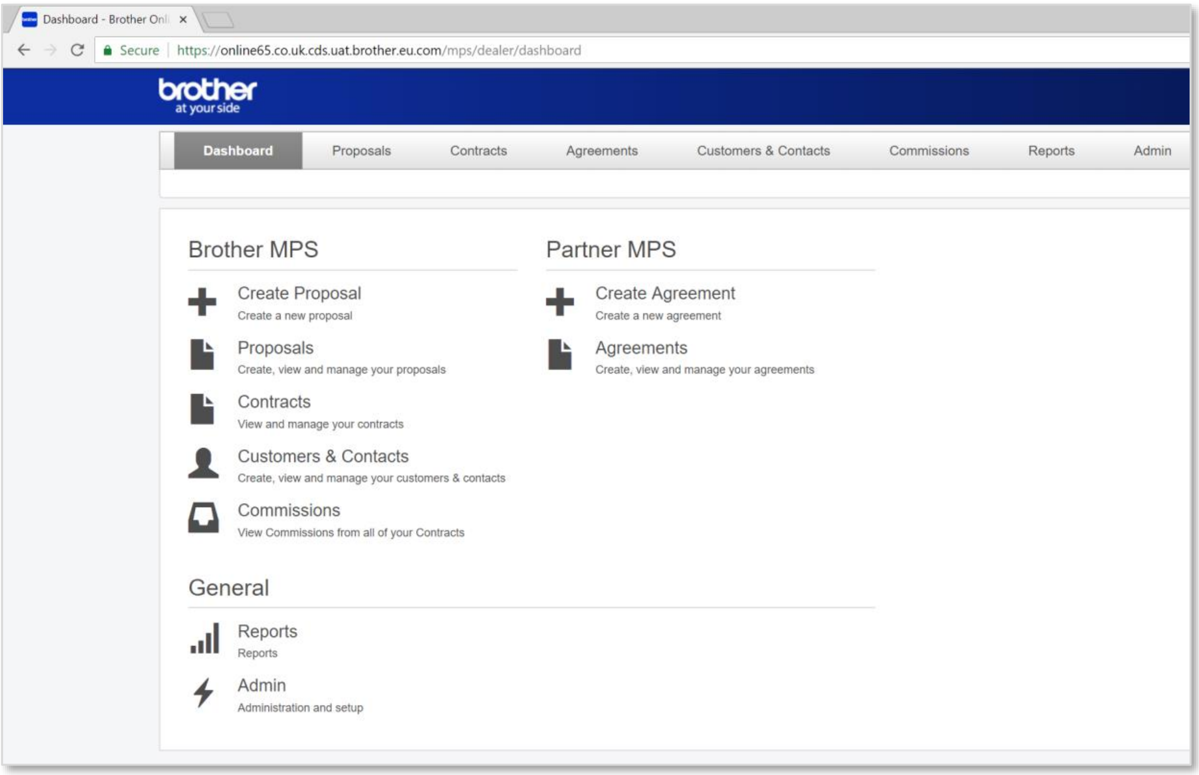


Figure 3: Brother Cloud MPS Portal

2 Structure

2.1 Network-connected machines

For network-connected machines, the Brother Cloud MPS system consists of four elements:

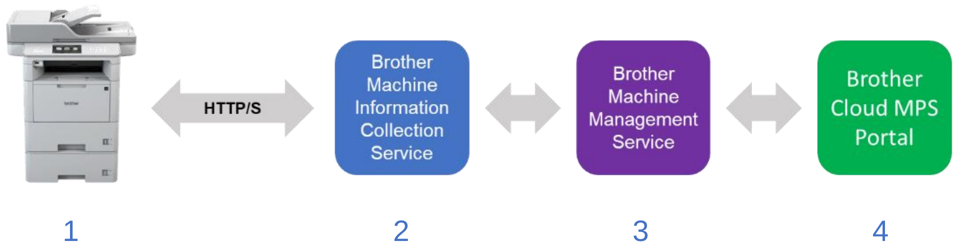


Figure 4: Brother Cloud MPS system elements (network-connected machines)

1 Brother Machine
A suitable Brother network machine that is communicating to Brother's machine information collection service.

2 Machine Information Collection Service
A Brother-developed service, which collects machine information that is needed by the Brother Cloud MPS system, located in Oregon, United States. This service is designed to work on the following network-connected machines:

- Select mono laser machines available since June 2012
- Select colour laser machines available since March 2013
- Select inkjet machines available since November 2016

3 Machine Management Service
A Brother-developed machine management service running on an Amazon Web Services (AWS) datacentre located in Frankfurt, Germany.

4 Brother Cloud MPS Portal
A Brother-developed service running on an Amazon Web Services (AWS) datacentre located in Dublin, Ireland.

2.2 USB-connected machines

For select Brother USB-connected machines, the Brother Cloud MPS system consists of five elements:

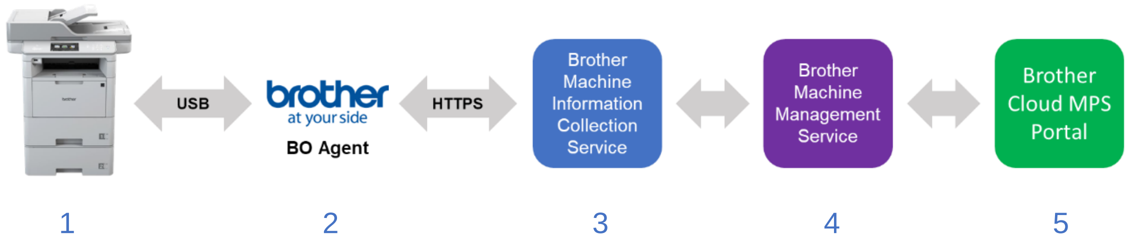


Figure 5: Brother Cloud MPS system elements (USB-connected machines)

1 **Brother Machine**
A suitable Brother USB machine.

2 **BOAgent**
Select Brother USB-connected machines communicate to a Data Collection Agent (DCA) called BOAgent. BOAgent, which runs on a Windows 7 (or later) platform, passes machine information to the Brother Cloud MPS via Brother's machine information collection server and Brother's machine management server. The DCA uses PJL commands to collect information from a USB-connected Brother machine. The BOAgent software is designed to work on the following USB-connected machines:

- Select mono laser machines available since June 2012
- Select colour laser machines available since March 2013
- Select inkjet machines available since November 2016

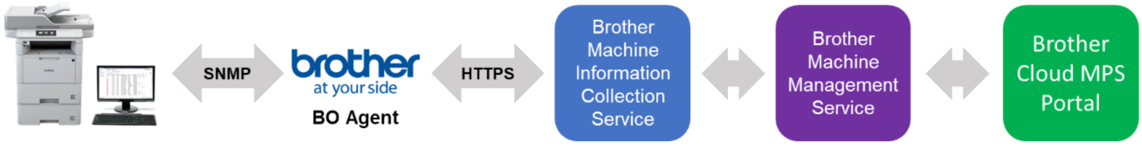
3 **Machine Information Collection Service**
A Brother-developed service, which collects machine information that is needed by the Brother Cloud MPS system, located in Oregon, United States.

4 **Machine Management Service**
A Brother-developed machine management service running on an Amazon Web Services (AWS) datacentre located in Frankfurt, Germany.

5 **Brother Cloud MPS Portal**
A Brother-developed service running on an Amazon Web Services (AWS) datacentre located in Dublin, Ireland.

2.3 BOAgent on a continuously operating server/computer

For network machines connected to a server or computer, the Brother Cloud MPS system consists of five elements:



1 2 3 4 5

Figure 6: Brother Cloud MPS system elements (network machines connected to a server or computer)

1 Brother Machine
A suitable Brother machine connected to a continuously operating server/computer.

2 BOAgent
Select Brother machines communicate to a Data Collection Agent (DCA) called BOAgent via SNMP. BOAgent, which runs on a Windows 7 (or later) platform, passes machine information to the Brother Cloud MPS via Brother's machine information collection server and Brother's machine management server. The DCA uses PJL commands to collect information from a USB-connected Brother machine. The BOAgent software is designed to work on the following USB-connected machines:

- Select mono laser machines available since June 2012
- Select colour laser machines available since March 2013
- Select inkjet machines available since November 2016

3 Machine Information Collection Service
A Brother-developed service, which collects machine information that is needed by the Brother Cloud MPS system, located in Oregon, United States.

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3 Machine Registration to Brother’s Machine Information Collection Service

3.1 Network-connected machines

Each Brother network machine that will form part of the MPS contract must be connected to the cloud. This process is known as machine registration. The machine registration process uses approximately 150 kB of data per machine.

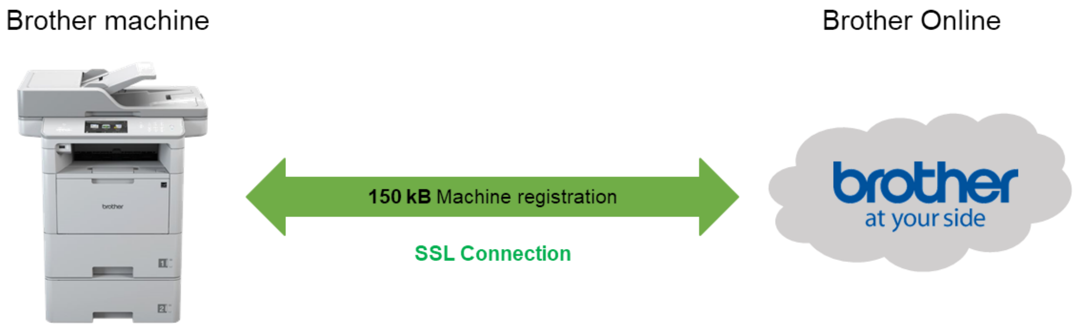

Figure 7: Brother machine registration with Brother Online

This means that one machine will generate approximately 150 kB of network traffic. 10 machines would generate approximately 1.5 MB of network traffic; 100 machines would generate approximately 15 MB of network traffic, etc. This is a one-off process per machine.

3.2 USB-connected machines

Brother USB machines are not able to connect directly to Brother’s machine information collection server. Therefore, a separate Windows tool known as BOAgent must be used to collect Brother machine information and pass that information to the Brother Cloud.

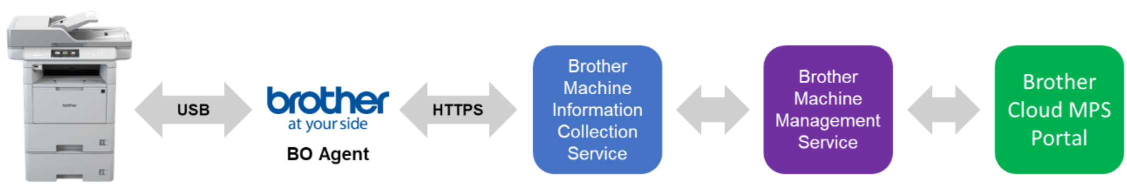

Figure 8: Brother Cloud MPS system elements (USB-connected machines)

3.3 Always-on network connection (Brother network machines)

The Brother network machine uses HTTPS (port 443) to communicate, as most firewalls are configured to allow port 443 outbound data through the firewall, therefore, in most instances no additional firewall configuration is needed. This always-on connection is essential for securing more accurate supplies delivery and contract billing.

Whereas print status information is sent to Brother Online occasionally, the connection to Brother's machine information collection service is updated, typically, every minute. At no point during this communication is the Brother network machine sending any print status information; it is simply keeping the network connection between the Brother network machine and the machine information collection service alive. It does this by sending approximately 10 kB of data to the machine information collection service which informs (via Brother's machine management service) the Brother Cloud MPS portal that the Brother machine is still alive and can be communicated with.

If the Brother network machine is switched off during this handshaking period, or some other change is made, e.g. the IP address of the Brother machine is changed, the Brother machine will automatically re-establish a connection with the machine information collection service when it is re-initialised. It may take up to 60 seconds for the Brother machine to re-connect to the machine information collection service. During this re-connection time, it will be impossible for the Brother machine to send any status information to the machine information collection service until both the Brother machine and the service have re-synchronised.

As already mentioned, the machine's connection to the machine information collection service represents approximately 150 kB of data for the initial registration with the service.

Once the Brother machine is connected to the machine information collection service, there are two types of handshaking:

1. Handshaking to inform the service that the Brother machine is still connected
2. Actual usage information that is used by the Brother Cloud MPS system

Both (1) and (2) use different amounts of data and have different frequencies:

- Handshaking – every minute
- Usage information – every hour

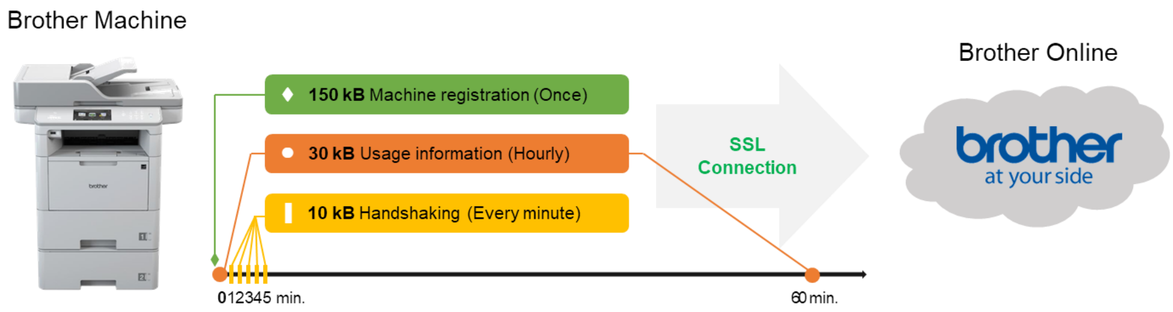

Figure 9: Approximate data traffic per machine

4 Data In Transit and At Rest

The following table shows the type of data that is in transit and at rest and the security methods used to protect it. The data shown here is stored in both Brother's machine information collection server and machine management server databases.

Data Type	Security
Online/Offline status	HTTPS
Machine type (model name)	HTTPS
Serial number	HTTPS
MAC address	HTTPS
Location (if provided)	HTTPS
Contact (if provided)	HTTPS
Mono and colour (if applicable) page count information	HTTPS
Toner/Ink status	HTTPS
Status of user replaceable parts	HTTPS
Coverage information	HTTPS
Error information	HTTPS

Table 1: Security methods for data in transit and at rest

In addition to the above, Brother's machine information collection server also stores specific machine information such as:

Data Type	Security
Model name	HTTPS
Serial number	HTTPS
Firmware version	HTTPS
IP address of the gateway	HTTPS
Supported paper size, colour/mono, duplex capabilities, etc.	HTTPS

Table 2: Machine information stored by Brother's machine information collection server

Appendix A – Connections Initiated by Brother Machines

A machine connected to a Brother Cloud MPS will use the following communication methods:

Service	Source	Destination	Port	Required for Brother Cloud MPS	Purpose
Brother Online	Brother network machine	• connections.brother.com • n.connections.brother.com	TCP, 443	Yes	Required for machines connected to Brother Cloud MPS
Brother Web Connect Root CA	Brother network machine	cu.bwc.brother.com	TCP, 80	Yes	If no CA certificate is available on the machine, or if the certificate is invalid, the "Failed Certificate Verification" message will appear on the machine's LCD and the machine will communicate with Brother Web Connect Root CA to retrieve the latest certificate.
Firmware update	Brother network machine	• firmverup.brother.co.jp • update.brother.co.jp • update-akamai.brother.co.jp	TCP, 443	*Optional*	If connected, enables a Brother machine to automatically update its embedded software.
NTP	Brother network machine	sntp.brother.com (default setting, any address can be used)	TCP, 123	*Optional*	If activated, a Brother machine will update the internal date and time using the time service.

Table A1: Brother Cloud MPS system – Communication Methods

Appendix B – Datacentre Information

Brother's Cloud MPS system, including Brother's machine information collection service, Brother's machine management service, and the portal itself, relies on Amazon Web Services (AWS). AWS provides a choice of datacentre locations, security capabilities, and operational features such as scaling and backup. Amazon have invested a lot of time in compliance and as such AWS has many important certifications, some of which are shown below:

Area	Standard	Details
Germany	C5	Operational Security Attestation
UK	Cyber Essentials Plus	Cyber threat protection
Spain	ENS High	Spanish government standards
UK	G-Cloud	UK government standards
Germany	IT-Grundschutz	Baseline protection methodology
Global	SCA	Cloud security alliance controls
Global	ISO 9001	Global quality standard
Global	ISO 27001	Security management controls
Global	ISO 27017	Cloud specific controls
Global	ISO 27018	Personal data protection
Global	SOC 1	Audit controls report
Global	SOC 2	Security, availability and confidentiality report
Global	SOC 3	General controls report

Table B1: Amazon Web Services (AWS) certifications

For the full AWS compliance list, see https://aws.amazon.com/compliance/programs.

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