GUIDELINE

ABB Ability™ Edge Industrial Gateway cloud connectivity guideline

Cloud connectivity requirements for ABB Ability™ Edge Industrial Gateway IoT devices

Contents

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This guide provides requirements and guidelines to make an ABB Ability™ EL Industrial Gateway IoT device communicating with the ABB Ability™ Energy and Asset Manager cloud platform.

1. General requirements

- Internet connectivity via a 100/1000 Mbit Ethernet with an RJ45 CAT.6 SFTP (or greater) cable

The Site IT Network Administrator should also provide either:

- A DHCP enabled network
- A valid, not yet allocated IP address, the subnet class, the gateway address, and a reachable DNS server (port 53/UDP)
- Optionally an internal NTP server may be also provided

A typical example is:

- IP: 10.0.10.123
- SUBNET: 255.255.255.0
- GATEWAY: 10.0.10.1
- DNS SERVER: 10.0.10.254 (DNS server may be on a different subnet)

1.1. Restrictions

Network used **to connect the ABB Ability™ Edge Industrial Gateway to the internet (IT network) must be on a different subnet as the network used to connect to the local field devices** (OT network). The default IP address used by the ABB Ability™ Edge Industrial Gateway OT network interface (ETH1) is 192.168.2.1 with a 255.255.255.0 subnet.

ETH1 port does not support DHCP. DHCP is supported, as client, for ETH0 and Wi-Fi interfaces.

The subnet 172.19.0.0/21 is reserved for internal gateway communications, and it cannot be configured on the ABB Ability™ Edge Industrial Gateway interfaces.

1.2. Ability™ EL Cloud Endpoints

1.2.1. DNS names resolution

The ABB Ability™ Edge Industrial Gateway must be able to perform DNS queries to the DNS server(s) configured via the ABB Provisioning tool or provided via DHCP.

1.2.1.1. IP address provided via DHCP

In a DHCP enabled network the DNS server IP address must be provided by the DHCP server

1.2.2. Network firewall configuration

- The firewall eventually configured on the network gateway must allow communications **FROM** and **TO** the configured **DNS** servers on port **53/UDP**
- The firewall eventually configured on the network gateway must allow communications **FROM** and **TO** the following **HTTPS** endpoints on port **443/TCP**

URL	Scope
https://abigtwyithiel12eunprd.azure-devices.net:443	Telemetry
https://global.azure-devices-provisioning.net:443	Device Provisioning
https://api.electrification.ability.abb:443	Device Provisioning Device Management
https://elcpabilityedgeacrprod01.azurecr.io:443	Device Provisioning Components update
https://elcpabilityedgeacrprod01.northeurope.data.azurecr.io:443	Device Provisioning Components update
https://elcpabilitystaprod01.blob.core.windows.net:443	Firmware upgrade
http://pki-scep.symauth.com/	PKI Certificate update

- The firewall eventually configured on the network gateway should allow communications **FROM** and **TO** the following **NTP** server on port **123/UDP**
  An internal NTP source can be optionally used, instead of the default one.

URL	Scope
time.google.com	Time synchronization
0.pool.ntp.org	Time synchronization

It is highly recommended to perform a FQDN based whitelist in the firewall. Please refer to section 1.3.2 if this option is not viable.

1.3. Additional notes

1.3.1. Proxy servers

Proxy servers are currently not supported by ABB IoT devices, direct internet connectivity must be provided. This feature will be made available in the future.

1.3.2. List of Azure IP addresses (whitelisting)

A list of IP addresses associated with the API endpoints is provided by the Microsoft Azure team at the following URL: https://www.microsoft.com/en-us/download/details.aspx?id=56519.

Involved datacenters and services are:

- AzureIoTHub.NorthEurope *for* abigtwyithiel12eunprd.azure-devices.net
- AzureIoTHub *for* global.azure-devices-provisioning.net

- AzureContainerRegistry.NorthEurope *for* elcpabilityimagesacrprod01.*azurecr.io
- Storage.NorthEurope *for* elcpabilitycommstaprod01.blob.core.windows.net

1.3.3. Type of data sent and received by ABB IoT devices

- Data outgoing from ABB IoT devices:
  - JSON payloads
  - AMQP over WebSocket TLS telemetry
  - DNS and NTP queries
  - SCEP for PKI certificate renewal
- Data incoming to ABB IoT devices: Cloud to device data comes as commands to update the device configuration model from the associated IoT Hub
- Data incoming to IoT devices via REST API replies:
  - JSON payloads
  - AMQP over WebSocket TLS telemetry
  - Binary encrypted and digitally signed archives (only for remote and local firmware upgrade)
- Other incoming data:
  - DNS and NTP replies

2. Cloud communication protocols and ports

2.1. Ports and protocols

Protocol	Remote Port	Local Port	Direction [1]	Destination / Source	Interface
HTTPS	443/tcp	Dynamic	Outgoing	Cloud	ETH0 WLAN WWAN
AMQP over HTTPS WebSockets	443/tcp	Dynamic	Outgoing	Cloud	ETH0 WLAN WWAN
NTP	123/udp	Dynamic	Outgoing	Cloud or Local [2]	ETH0 WLAN WWAN
DNS	53/udp 53/tcp	Dynamic	Outgoing	Cloud or Local [2]	ETH0 WLAN WWAN

DHCP	67/udp	68/udp	Incoming [3]	Local	ETH0 WLAN

[1] Communications are always initiated by the gateway to a remote destination and port
[2] Customer provided NTP and DNS servers can be used
[3] Limited to the local network only

2.2. Destinations

2.2.1. HTTPS / AMQP over HTTPS WebSockets

- https://abigtwyithiel12eunprd.azure-devices.net:443
- https://global.azure-devices-provisioning.net:443
- https://api.electrification.ability.abb:443
- https://elcpabilityedgeacrprod01.azurecr.io:443
- https://elcpabilityedgeacrprod01.northeurope.data.azurecr.io:443
- https://elcpabilitystaprod01.blob.core.windows.net:443
- https://pki-scep.symauth.com:443

2.2.2. NTP

Pre-configured NTP servers are:

- time.google.com
- 0.pool.ntp.org

NTP servers can be customized based on Customer's needs.

2.2.3. DNS

DNS servers are retrieved via DHCP or manually configured by Customer on the ETH0 / WLAN / WWAN interface.

3. Local communications protocols and ports

3.1. Protocol and Ports

Protocol	Remote Port	Local Port	Direction	Destination / Source	Interface
HTTPS	Dynamic	5001/tcp	Incoming	Local	ETH1
HTTPS	Dynamic	18831/tcp	Incoming	Local	ETH1
MODBUS	Dynamic	502/tcp	Incoming	Local	ETH1
MODBUS	502/tcp	Dynamic	Outgoing	Local	ETH1

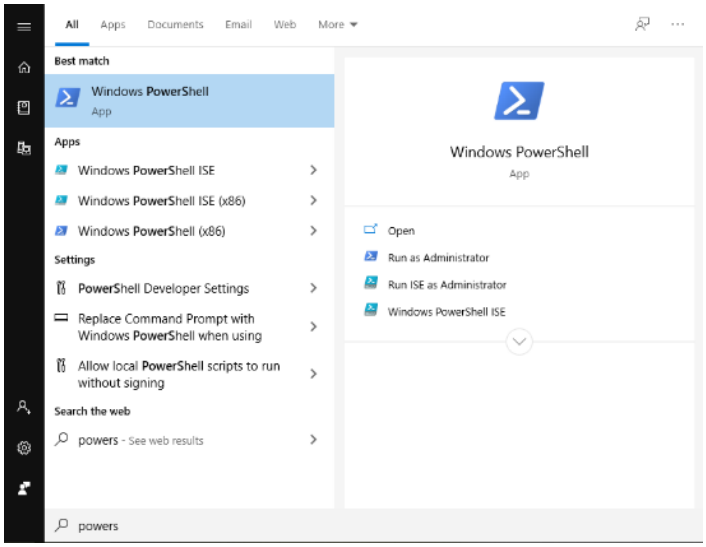
4. Connectivity troubleshooting guide

A computer must be connected to the same network used by the IoT device to get cloud connectivity.

When an ABB EL Industrial Gateway is being used, the computer *must* be connected to the ETH1 port and cable providing cloud connectivity *must* be connected to ETH0.

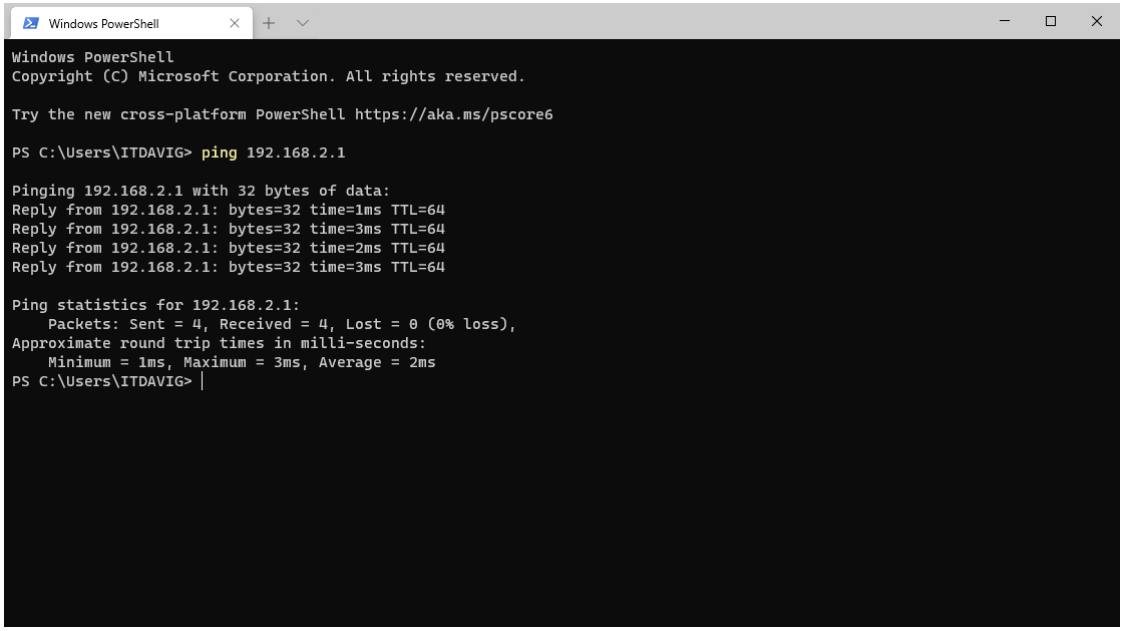
4.1. Windows

Requirements: Windows PowerShell



4.1.1. Testing basic connectivity

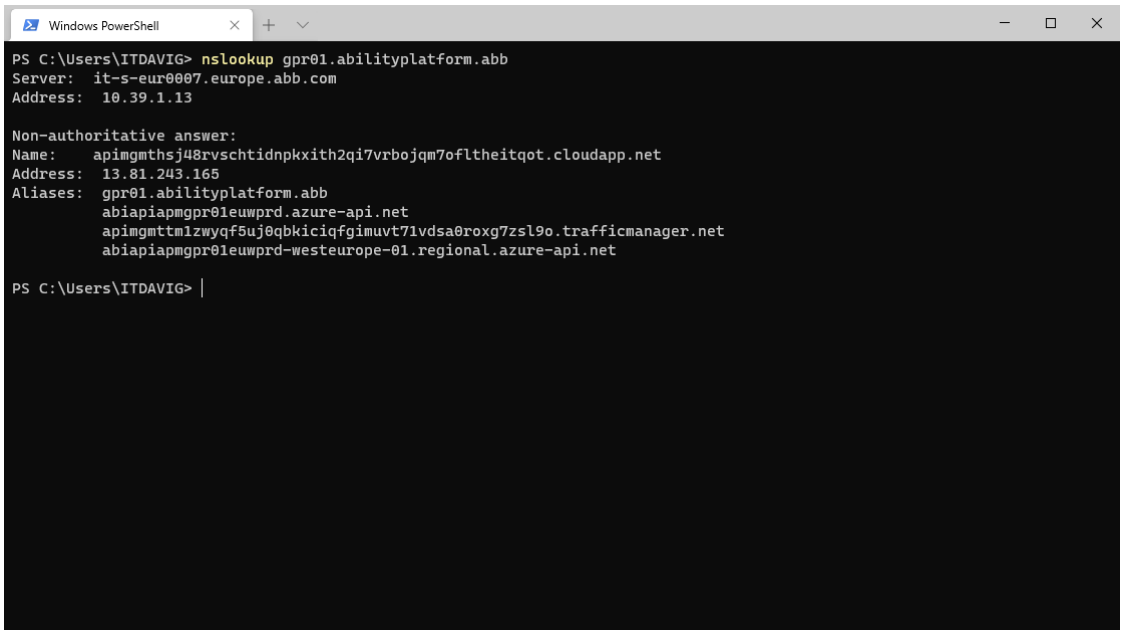
```
> ping <gateway IP address>
```



WARNING: ping (ICMP protocol) may be blocked by network security policies. Please check with the Customer Network Administrator.

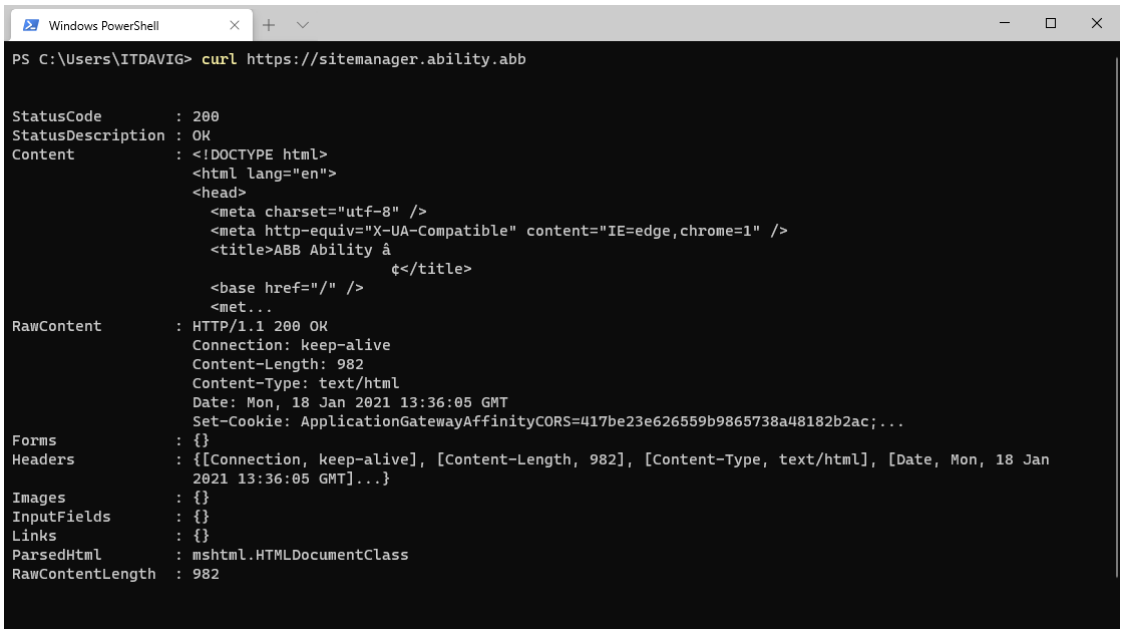
4.1.2. Testing the default DNS server

```
> nslookup gpr01.abilityplatform.abb
```



4.1.3. Testing HTTPS connectivity

```
> curl https://sitemanager.ability.abb:443
```



5. Getting support

For any information or support request please contact
global-el.operations.digital@abb.com