



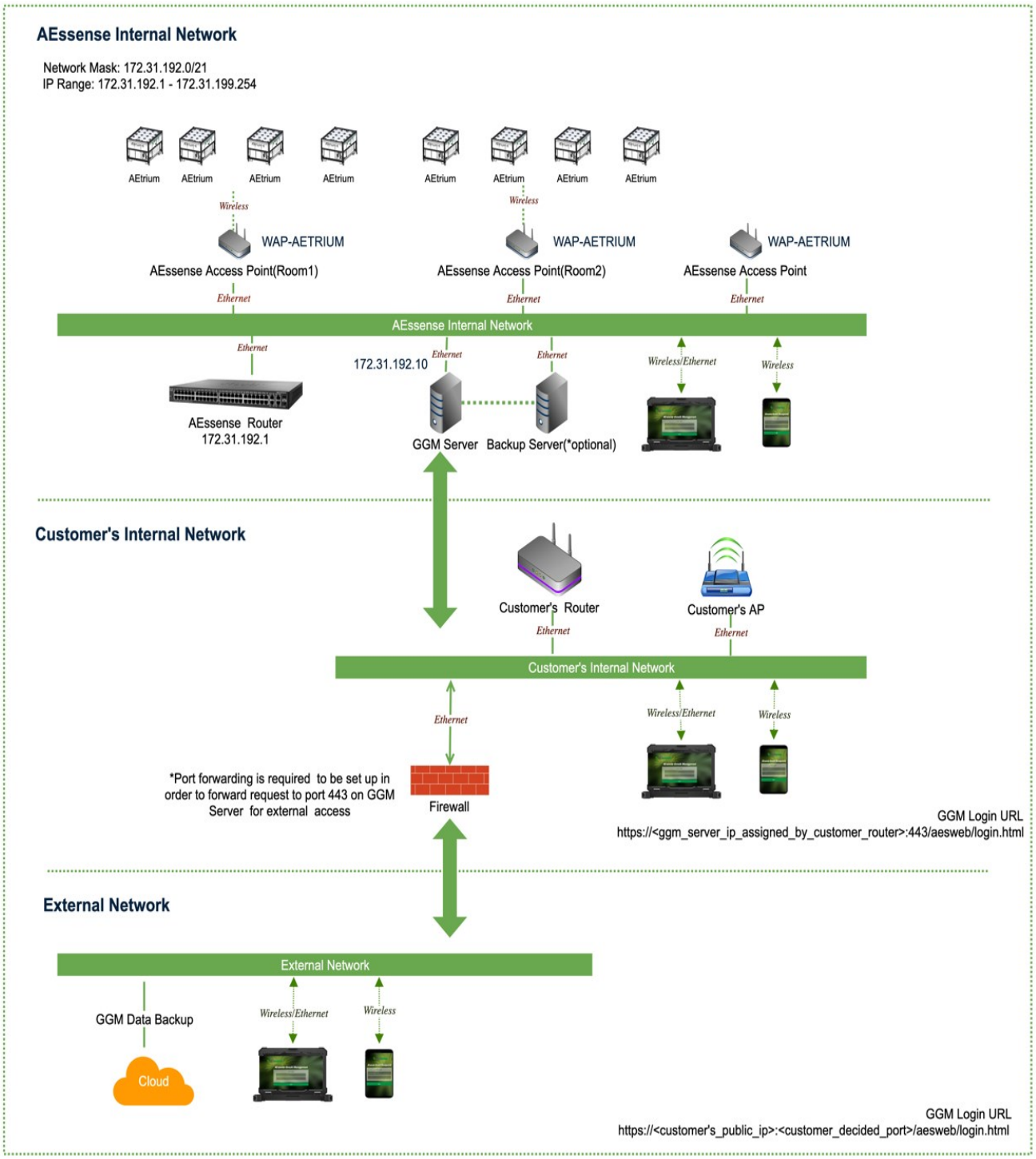
AEssenseGrows System Network Topology





The AEssenseGrows System Network is comprised of three parts: the **AEssenseGrows Internal Network**, the **Customer Internal Network** and the **External Network.** In order to offer a secure and private subnetwork for all AEssenseGrows devices and keep communications between these devices isolated from all others, AEssenseGrows provides the required networking equipment for customers to build their own private network. The Customer Internal Network and External Network are necessary for cloud services and remote access from anywhere.

The network topology described is recommended by AEssenseGrows. If there are special networking requirements, please check with the AEssenseGrows sales team.



AEssenseGrows Internal Network

This self-contained private network connects all AEssenseGrows devices, which is sufficient to build a standalone fully automated plant growth system.

AEtrium Grow Systems

AEtrium Grow Systems include the AEtrium-4, AEtrium-2.1, and other AEssenseGrows control devices.

AEssenseGrows Access Point (WAP-AETRIUM)

An access point is a networking hardware device that allows other Wi-Fi devices to connect to a wired network. All AEssenseGrows APs will be assigned a default SSID ***WAP-AETRIUM****, and all AEtrium Grow Systems will be pre-configured with the given default SSID to be connected within the AEssenseGrows Internal Network. This is part of all AEssenseGrows server packages.*

AEssenseGrows Router

This is the core networking device in the AEssenseGrows Internal Network, which offers DHCP service for all connected devices. Its default IP is ***172.31.192.1****, the netmask is* ***255.255.248.0****, the network is* ***172.31.192.0/21****, and all devices connected to the router will be assigned an IP within the range of* ***172.31.192.2*** *and* ***172.31.199.254****. This is part of all AEssenseGrows server packages.*

GGM Server

The intelligent ***Guardian Grow Manager (GGM)*** *software system is installed on the* ***GGM*** *server, which is the control center for all AEtrium Grow Systems under the same AEssenseGrows Internal Network. The default IP, 172.31.192.10, is provided and should not be changed because the default server IP configured inside the AEtrium Grow System is 172.31.192.10. This is part of all AEssenseGrows server packages.*

Backup Server (optional – but highly recommended)

A backup server offers a near real-time disaster solution for the ***GGM*** *server. If the control system goes down due to a* ***GGM*** *server hardware failure, a backup server can help get the entire system back online within 5 minutes. It is highly recommended for those wanting to ensure they can monitor their grow systems at all times.*

GGM Internal Access

*Any computers or handheld devices can access the **GGM** website after connected to the AEssenseGrows Internal Network through the AEssenseGrows AP – SSID: **WAP-AETRIUM**.* The URL for the web application is: **https://172.31.192.10/aesweb/login.html**.

Ethernet Connection

AEtrium-2.1 devices can be connected with the AEssenseGrows Internal Network through Ethernet cable as well as WiFi. It is also highly recommended to have two physical Ethernet cables and jacks reserved for every AEtrium-2.1 device.

Customer Internal Network

All of a customer's other equipment can be connected with **GGM** through the Customer Internal Network. For security purposes, a firewall is highly recommended to block access from external sources.

Customer's Router

*This is the core networking device in the Customer Internal Network, which offers DHCP service for all connected devices. Its default IP, netmask and IP ranges for connected devices are under the customer's control. The **GGM server** is a bridge to connect the AEssenseGrows Internal Network and the Customer Internal Network, **and there is no special requirement to make this connection.***

GGM Server – second network connection

The **GGM** server contains two network cards. One makes the connection with the AEssenseGrows Internal Network, and its default IP address is 172.31.192.10. The other makes the connection with the Customer Internal Network, and its IP address is provided by the customer's router through DHCP.

Customer's Access Point

Access points are installed under the Customer Internal Network to connect all the customer's equipment under the same internal network. Their SSIDs and passwords are controlled by the customer's IT department, which should have no involvement with the AEssenseGrows Internal Network.

Firewall

A firewall is a network security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules. A firewall typically establishes a barrier between a trusted internal network and untrusted external network, such as the Internet. It is highly recommended for all customers.

GGM Access

*Any computers or handheld devices can access the **GGM** website after connecting to the Customer Internal Network through the customer's Apps or Ethernet.* The URL for the web application is:
https://<ggm_server_ip_address_assigned_by_customer_router>/aesweb/login.html

External Network

Cloud service is required to back up all plant growth-related data. In addition, if a customer wants to view and control the AEtrium Grow Systems remotely from outside of the growth facility, external network access has to be set up properly and a static public IP is required.

Cloud Services

Amazon Web Services (AWS) is a comprehensive, evolving cloud computing platform provided by Amazon. *AWS cloud services are used by the **GGM** software system to back up all plant growth-related data.*

Port Forwarding

In computer networking, ***port forwarding,*** or port mapping, is an application of network address translation (NAT) that redirects a communication request from one address and port number combination to another while the packets are traversing a network gateway, such as a router or firewall. It is a required step for customers wanting to view and control the AEtrium Grow Systems from outside of the growth facility. Port 443 is the internal port number for port forwarding, and the customer can decide a port number for external access.

GGM Access

Any computers or handheld devices can access the **GGM** website after connected to the Internet. The URL for the web application is:
https://<customer_public_ip>:<customer_decided_port>/aesweb/login.html.

Network Speed

We recommend Upload and Download network speeds of at least **25Mbps** if there are no more than 25 AEtrium devices. Higher network speeds are preferred when more AEtrium devices are connected.

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