



AEM Elements™ 360 Implementation Scope of Work – Self-(Customer-) Hosted Instance

The AEM Customer Success and Software Engineering teams commit to providing a base-level initial configuration for each AEM Elements™ 360 implementation, which shall include the following components:

Applications and Services

The AEM Elements 360 application will be installed on the dedicated server, with Services for primary functional components configured. Core Services include Alarms, Analytics, API, Data Manager, Database Backup, File Backup, Interpolation, Metrics, Re-Validation, Scheduler, System manager, Time Series, Timeout, Update Scheduler. Additional Services relating to data feeds may be configured on an as-needed basis. Additional variables will be configured in alignment with the default installation template.

Clients and Users

One Client (Licensed Client) will be provisioned, to which AEM Service and Support Accounts will be added with appropriate privileges to permit ongoing support services. Furthermore, one import of customer Users will be performed. The customer point of contact must provide a list of usernames, email addresses, and privileges prior to the time when training occurs.

Web UI

A Home Page will be added following the AEM Elements 360 default template.

Systems and Views

Input Systems will be added for the following scenarios:

- Installations to be performed by AEM staff associated with the initial project
- Migrations of existing feeds supported by current AEM Elements 360 functionality

Sites will be added to any configured Input Systems. Site metadata must be provided in the format requested by AEM, with all required fields completed. Optional fields are optional. Any changes, including additions, edits, or removals, to Site metadata after the initial import is complete will be the responsibility of the customer. Sites will be added to the Default View.

Sensors and Data

Sensors will be added to any configured Sites. Sensor metadata must be provided in the format requested by AEM, with all required fields completed. Optional fields are optional. Any changes, including additions, edits, or removals, to Sensor metadata after the initial import is complete will be the responsibility of the customer.

Maps



Default Map Layers will be added as outlined by the purchase software license and package.

Alarm Rules

For Replicating server sets, replication status alarm rules will be configured to send notifications to AEM Operations Support and customer points of contact. Systems with Services supporting an Extended Process Status Attribute (such as ALERT2) will have System Process Status alarm rules configured for those feeds and will send notifications to customer points of contact. Requested components outside of this scope of work must be individually addressed within the software contract.

Self-Hosted Instance Launch Services

There are four key areas of consideration to smooth the process of implementation:

- Time
- Pre-Installation Plan
- Server (Virtual or Hardware)
- Services & Training

Time

Following receipt of a purchase order/contract, please allow for at least four to six weeks to allow for pre-installation planning, review of server and network requirements, and setup.

Pre-Installation Plan

Involve and get a commitment from all appropriate personnel for your installation plan; create a cross-functional installation team (IT/networking administrators, end users, management, etc.) with a designated lead. The following should be considered as part of your pre-installation plan:

Server and Network

Understand the AEM Elements 360 Self-Hosted system and server requirements and open ports for services including remote connectivity. Set up Wide Area Network (WAN) address and Network Address Translator (NAT) to internal server Local Area Network (LAN) address.

Set up (1) one domain name registered to the WAN address for AEM Elements 360 (required) and one (1) for AEM Elements 360 Inventory plus (optional). If you plan to deploy a public website, set up network URL addresses and establish firewall rules to allow external access.

If planning a hybrid deployment (AEM Elements 360 Dedicated Instance with AEM Elements 360 Self-Hosted), consider network connectivity, firewall access, etc. Identify which will be the primary server and which will be the secondary and determine the failover process. All load-balancing and packet inspection network devices should be configured to allow necessary network traffic to AEM hosted services.



For local data transfer, install data transfer device and/or ensure network is configured to allow for communication of data to AEM Elements 360.

Data Ingest

Identify sources of data to be ingested in AEM Elements 360 – will these be AEM or third-party sources?

Software Application

Compile system metadata and complete the Configuration Details Workbook tabs for Sites, Sensor Types, and Sensors. Visit <https://help.elements360.aem.eco/url/c6g> to download the Configuration Details Workbook. Define the list of Users, providing name, email address, and application privileges in the Configuration Details Workbook tab for Users. Once complete, return the Configuration Details Spreadsheet to AEM Customer Success for review.

Training

AEM Elements 360 is a dynamic product with many features. Our web-based or on-site training ensures you gain the maximum value from your AEM applications and products and enables you to confidently utilize the product in its entirety. AEM provides in-depth end-user and system administrator training with your own system and data. Training includes:

System Administration Training

Detailed training on server access and usage. Full description and details of the architecture of the system, how all the components interface and details of each component. Troubleshooting and problem-solving processes are covered. This advanced training is designed for those responsible for maintaining the servers, applying software upgrades, and performing system failovers.

AEM Elements 360 Administration Training

Setting up users and authorizing privilege levels, establishing sites and sensors, creating validation formulas, setting thresholds, and creating alarm rules and notifications, acknowledging and clearing alarms, accessing alarm logs, accessing standard maintenance reports, modifying themes, adding content and links.

AEM Elements 360 User Training

Detailed user interface, viewing data with map view and site lists; drilling down to sensor data. Use of single and multiple graphs. Retrieving historical data and exporting data. Overview of detailed help system.

Access to AEM Elements 360



AEM Elements 360 does not require use of an installed software application; instead, access is via a standard web browser, with the latest versions of Google Chrome, Mozilla Firefox, Microsoft Edge, and Apple Safari supported.

AEM Elements 360 Self Hosted Platform Requirements

Operating System

AEM Elements 360 runs on Oracle Linux 9, which is a free, open-source version of Red Hat 9. Operating System installation support is covered in AEM's setup pricing. During setup, the "Minimal" software group install is selected. One (1) AEM Elements 360 Self Hosted software license is required per server. Additional AEM Elements 360 Self Hosted licenses must be purchased for deployment on each additional server.

Server Requirements

AEM recommends installing the AEM Elements 360 software on a virtual machine within a larger IT system if proper infrastructure and support is available. If a dedicated physical server is required, choose a rack or tower solution, whichever form factor best suits your server environment.

Minimum Virtual Server Requirements

These are suggested minimums. Each client install is unique so changes might need to be made based on anticipated workload.

- CPU: 2.8GHz, multiple cores
- Memory: 8gb RAM
- Storage: 300gb
- OS: RedHat Oracle Linux 9.x

Minimum Physical Server Requirements

These are suggested minimums. Each client install is unique so changes might need to be made based on anticipated workload

- CPU: Modern (2022 or later) Intel Xeon, 2.8GHz, 8 cores (e.g. Intel Xeon E-2378G)
- Memory: 16gb RAM
- Storage: 500gb, Hardware RAID-5 enabled
- OS: RedHat Oracle Linux 9.x

Minimum Network Requirements

- Broadband as defined by the United States Federal Communications Commission (U.S. FCC).
- All load-balancing and packet inspection network devices should be configured to allow necessary network traffic to AEM hosted services.

Incoming Network Ports

Open network ports are required as follows:

Port	Use Description
80	Web Access to Contrail Web on the server
8080	Contrail Data Exchange interface
8181	Contrail Inventory application
3306	MySQL access
22	Default SSH port (sometimes moved to an off port for security)
60001 - 60170	Reserved for various data collectors; ranges to be further specified based on collector type

Outgoing Network Ports

The following outgoing ports are required for data feeds and software updates:

Port	Use Description
25	SMTP (Simple Mail Transfer Protocol). Required for Contrail to send emails and text messages from alarms. Also used to send reports and notifications of system events.
80 and 8080	Allows data agents to bring in data like USGS, METAR, or HADS.
IP Outgoing Access/ 443	Required for software updates: Red Hat or Oracle Linux, and OneRain (handles by allowing IP outgoing access to specific IP or ranges of IP addresses).
123	NTP service using UDP for time synchronization.

Accessible Endpoints

The following outgoing ports are required for data feeds and software updates:

Domain	Use Description
a-tile.onerain.com b-tile.onerain.com c-tile.onerain.com tile.onerain.com	Required for viewing of map tiles in Map module
repository.onerain.com	Required for software updates: Red Hat or Oracle Linux, and AEM

NOTE: Incoming and Outgoing ports between multiple servers must be allowed to enable two-way data communication and synchronization.



For hybrid configurations that include AEM Elements 360 Self Hosted and AEM Elements 360 Dedicated Instance, ports assignments will differ from those shown above. Contact AEM Support for port assignments.

Hypertext Transfer Protocol Secure – HTTPS-Only Standard

The strongest privacy and integrity protection currently available for public web connections is Hypertext Transfer Protocol Secure (HTTPS). HTTPS is a combination of HTTP and Transport Layer Security (TLS). TLS is a network protocol that establishes an encrypted connection to an authenticated peer over an untrusted network.

TLS/SSL is the de facto standard for encrypted and authenticated communications between clients and servers on the Internet.

- Transport Layer Security (TLS) is the successor of Secure Sockets Layer (SSL); they are both cryptographic protocols that provide secure communications on the Internet for such things as web browsing, e-mail, Internet faxing, instant messaging, and other data transfers. There are slight differences between SSL and TLS, but the protocol remains the same.
- A TLS/SSL certificate is required to enable encryption and authentication on your site domain and use the HTTPS protocol.
- Data between the browser and **AEM Elements 360** is encrypted. This is important for transmitting sensitive data like username and password.

Please visit <https://https.cio.gov/> for technical assistance and best practices to aid in the implementation of this policy.

Security and Encryption for AEM Hosted Services

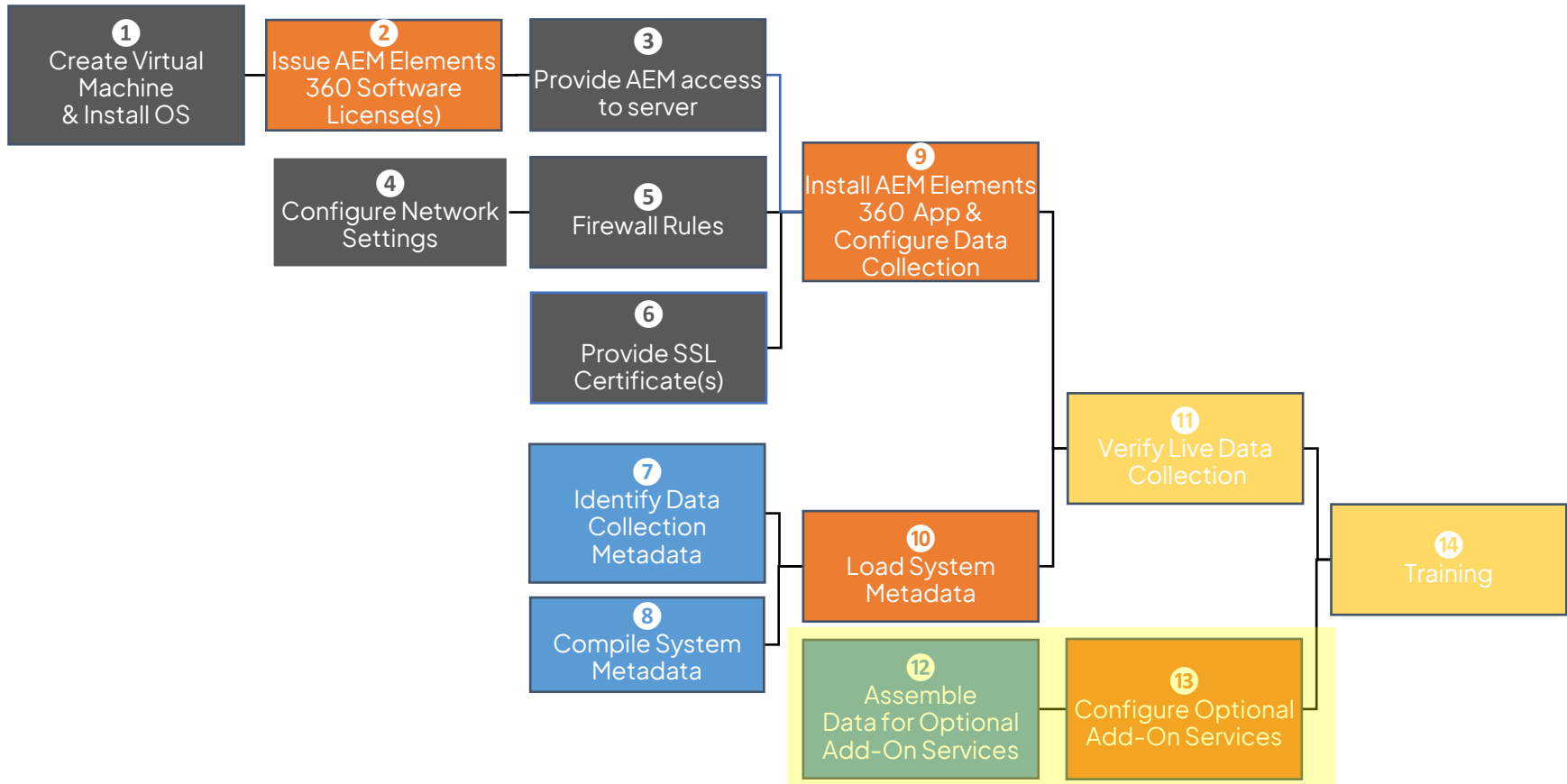
All services hosted by AEM use secure communication via HTTPS. Any requests made via HTTP are re-routed to HTTPS. All servers hosted with AEM using an *.aem.eco domain name is also provided with an SSL certificate.

Security and Encryption for Customer Hosted Services

All services hosted by customers are strongly encouraged to use secure communication via HTTPS. It is the responsibility of the customer to source and provide SSL certificates for self-hosted services.



Software Implementation Process for Virtualized Hardware for Elements™ 360 Self-Hosted



Items 12 and 13 are not included in the standard scope of services provided by AEM for a new AEM Elements 360 deployment. AEM reserves the right to request additional funding from the customer to address these types of optional services. Please see the section before for more details on what services are not included in the standard scope of work.

Steps	Tasks	AEM	Client IT	Client System Admin.	All
1	Create Virtual Machine(s) & Install OS		✓		
2	Issue AEM Elements 360 software license authorization key(s)	✓			
3	Provide AEM command line access to Server		✓		
4	Configure Network Settings		✓		
5	Firewall Rules		✓		
6	Provide SSL certificate(s)		✓		
7	Identify Data Collection Metadata Provide Data Collection System information			✓	
8	Compile System Meta Data Provide Site and Sensor Metadata definitions via Configuration Details Workbook			✓	
9	Install AEM Elements 360 Application & Configure Data Collection Install AEM Elements 360 application and perform advanced configuration of data collectors, data agents and other services	✓			
10	Load System Metadata • Load metadata provided in Step 8	✓			
11	Verify Live Data Collection Confirm that data are being collected and correctly processed as expected				✓
12	Assemble Optional Data for Add-On Services Examples of add-on services may include lightning weather services, historical data loads, single sign-on (SSO), etc.			✓	
13	Configure Optional Add-On Services	✓			
14	Training				✓

Network Setup for AEM Elements 360 Self-Hosted on Enterprise Linux 9.X

A pre-installed Contrail Self-Hosted is configured for DHCP (dynamic host configuration protocol) network addressing before shipment. Static network address configuration is recommended for server operations to allow routing of data. To access the server remotely for management and data



viewing, either the IP address assigned to the server is an Internet-accessible IP, or Port Forwarding techniques can be used to permit communications from external hosts to access the server inside a local network.

Contact your network administrator to request the necessary network settings.

Local IP address: (i.e. 192.168.1.100)
Gateway address: (i.e. 192.168.1.1)
Subnet mask: (i.e. 255.255.255.0)
Primary DNS address:
Secondary DNS address:
External IP address:
Network Ports:

To view current server network settings using `ifconfig`

1. View current network configuration of (eth0) tool.
2. Type on the command prompt: **ip a**

Edit the server network settings using the command line

1. Open the text-based network configuration tool. Type on the command prompt: **system-config-network**
2. Use the keyboard <Tab> to navigate the interface. Use the <Enter> key to confirm an action. Use the <Space> key to select or un-select options.
3. Select Action > Device configuration.
4. Select a Device > (eth0).
5. Network Configuration:

Unselect "Use DHCP" to edit the static network information
Static IP = Local IP address
Netmask = Subnet mask
Default gateway IP = Gateway address
Primary DNS Server = Primary DNS address
Secondary DNS Server = Secondary DNS address

6. Save the network changes.
7. Select Action > DNS configuration.
8. DNS configuration:

Hostname = primary (machine name without spaces)
Primary DNS = Primary DNS address
Secondary DNS = Secondary DNS address
Tertiary DNS = (Optional)
DNS search path = onerain.net (organization may provide)

9. Save the network changes (Save & Quit).



10. Restart the server for changes to be applied. Type on the command prompt: **reboot**



Self-Hosted Instance Excluded Services

The list below outlines the implementation and ongoing services that fall outside of the scope of work for an AEM Elements 360 dedicated instance. These services can be quoted as add-ons on request.

- Recurring weekly/periodic project management meetings.
- Setup and configuration of alarms (including alert types and alarm evaluations), thresholds, and views – training will be provided but the client is responsible for final setup and configuration of these items.
- Setup and configuration of Dashboards – training will be provided but the client is responsible for final setup and configuration of these items.
- Integration with other systems (e.g. possible API work, etc.).
- Assisting the client with redefining their processes/procedures around their AEM Elements 360 solution.
- Documentation of as-built systems.
- Development work required to ingest and display data from non-AEM sensors/equipment where the sensors/equipment do not report data in formats that AEM Elements 360 can already support.
- Development work required to integrate with other systems (e.g. possible API work, etc.) not currently supported by AEM Elements 360.
- ALERT2 configuration and upgrades.
- Any training following the initial deployment training. Additional training (e.g. weekly/monthly webinars, refresher training, etc.) can be quoted on request.
- Troubleshooting configurations external to AEM Elements 360 (e.g. third-party data feeds, external network issues, etc.).
- Validation/verification of software capabilities against external, non-contractual requirements.
- Confirmation and/or analysis of data quality and accuracy for data sets not supplied by AEM.
- Any changes, including additions, edits, or removals, to Sensor metadata after the initial import is complete will be the responsibility of the client.
- Identifying Site groupings such as watersheds, water basins, fire borders, or other logical groups for Views – should be accomplished by the client prior to training.
- Collect additional information to enhance the Site and Sensor metadata. Site images, maintenance or public notes about the installations, Sensor thresholds, and compile historic events such as maximum values during storms – should be accomplished by the client prior to training.
- Themes of AEM Elements 360's user environment to match your organization's look and feel. Choose an existing Web site as the template for the theme, or collect logo images, color swatches, and links to be used – should be accomplished by the client prior to training.
- Provide an agency-relevant application name for configuration of AEM's hosted sub-domain (e.g., myagency.elements360.aem.eco). All Dedicated Instances will end in "elements360.aem.eco" – only the "myagency" component can be customized.
- Provisioning additional numbers of Clients and Users above and beyond what is outlined in the contract.





AEM reserves the right to contact the Client to discuss any potential ambiguities with respect to services that are or are not considered out of scope based on the purchase, contracted services, as well as potentially adjust pricing as applicable.

