Intel® AI Edge System Qualification

Get Started Guide

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System Requirements

Before starting, ensure your system meets the following Edge AI performance swimlanes requirement:

Hardware

Intel® ESQ supports a wide range of Intel® edge systems optimized for various performance and use case requirements.

For ESQ Qualification, we only accept 2025-2026 launched CPU products.

Edge AI Performance Swimlane	CPU	Memory (Min)	Storage (Recommended)	Discrete GPU Pairing
Scalable Performance	Intel® Xeon® 6 Processors, 5th Gen Intel® Xeon® Scalable Processors, Intel® Xeon® W Processors	256GB	1 TB	-
Scalable Performance Graphics & Media	Xeon-Based: Intel® Xeon® 6 Processors, 5th Gen Intel® Xeon® Scalable Processors, Intel® Xeon® W Processors Core-Based: Intel® Core Ultra Series 2, Intel® Core™ Series 2	**Xeon-Based: Minimum System Memory**: 128 GB DDR5 (Dual Channel) **Core-Based: Minimum System Memory**: 64GB DDR5 (Dual Channel)	1TB	Intel® Arc™ B-Series Graphics, Intel® Arc™ Pro B-Series Graphics
Efficiency Optimized AI	Intel® Core™ Ultra Processor Series 2	32 GB	512 GB	-
Mainstream	Intel® Core™ Series 2	32 GB	512 GB	-
Entry	Intel® Processor for Desktop Intel® Processor X-series Intel® Processor N-series	32 GB	512 GB	-

Operating System

ESQ software supports the following operating systems:

OS	Version	Notes
Ubuntu*	24.04 Desktop LTS or newer	Recommended Linux* distribution
Ubuntu*	24.04 Server LTS or newer	Supported only for server/Xeon Platforms
Windows*	11	Not Supported

System Dependencies

Install the following dependencies before initiating system qualifications.

System Drivers

Configure system drivers:

```
sudo bash -c "$(wget -qLO - https://raw.githubusercontent.com/open-edge-platform/edge-developer-kit-reference-scripts/refs/heads/main/main_installer.sh)"
```

System Dependencies

Install essential system packages:

```
sudo apt update && sudo apt install -y curl git libgl1
```

Docker Engine

Install Docker* Engine:

```
# Add Docker's official GPG key
sudo apt-get update
sudo apt-get install ca-certificates curl
sudo install -m 0755 -d /etc/apt/keyrings
sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg -o /etc/apt/keyrings/docker.asc
sudo chmod a+r /etc/apt/keyrings/docker.asc

# Add the repository to Apt sources
echo \
  "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.asc] https://download.docker.com/linux/ubuntu \
  $(. /etc/os-release && echo "$VERSION_CODENAME") stable" | \
  sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
sudo apt-get update

# Install Docker packages
sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin
```

Add your user to the docker group:

Note:
Adding your user to the docker group grants root-level access. This should only be done on development or test systems.

```
sudo usermod -aG docker $USER
```

To activate your new group membership in your current terminal, run:

```
newgrp docker
```

This command starts a new shell session with updated group permissions, allowing you to use Docker* without logging out.

To verify Docker* installation run commands below:

```
docker ps
```

Note:
If you see a list of containers (even if empty), indicates user registered to new docker group. If you get a permission error, re- run newgrp docker in your terminal. For persistent access across all sessions, log out and log back in, or reboot your system.

Additional Reference:
For detailed Docker* installation instructions, see the official Docker* Engine installation documentation.

Python Package Manager

Install uv to accelerate Python* package management:

```
curl -LsSf https://astral.sh/uv/install.sh | sh && source
$HOME/.local/bin/env
```

Enabling Power Monitoring Feature

Running Average Power Limit (RAPL) provides us energy consumption data from Intel processors. To allow Intel® ESQ to collect power configuration information without requiring root privileges, please configure non-root access to RAPL (Running Average Power Limit) powercap files for platform power monitoring

Run the automated setup script to configure group-based permissions:

```
sudo bash -c "$(wget -qLO - https://raw.githubusercontent.com/open-
edge-platform/edge-system-
qualification/refs/heads/main/scripts/setup-powercap-
permissions.sh)"
```

This setup script:

- Auto-detects all powercap energy files on your system
- Creates a powercap group for secure, user-specific access
- Adds your user to the powercap group
- Configures persistent permissions via /etc/sysfs.d/powercap.conf (applied automatically on boot)
- Grants script permission immediately for current session

```
$ sudo bash -c "$(wget -qLO - https://raw.githubusercontent.com/open-edge-platform/edge-system-qualification/refs/heads/main/scripts/setup-powercap-permissions.sh)"
=== Platform Power Monitoring Setup ===

[1/3] Checking group 'powercap'...
 ✓ Group 'powercap' already exists
[2/3] Checking user 'user' group membership...
  Adding user 'user' to group 'powercap'...
 ✓ User added to group
[3/3] Detecting powercap files and configuring permissions...
 Detected 3 powercap energy files
 ✓ Configuration written to /etc/sysfs.d/powercap.conf
 ✓ Permissions applied to current session

=== Setup Complete ===

✓ Setup complete - group membership configured

IMPORTANT: Your current shell session needs group activation
 (User was just added to 'powercap' group)

Choose one option to activate:

 Option 1 - New shell with group active (RECOMMENDED):
  newgrp powercap
  # This starts a new shell with the group loaded
  # Type 'exit' when done to return to original shell

 Option 2 - Logout and login again (or reboot)

After activation, verify access:
 cat /sys/class/powercap/intel-rapl/intel-rapl:0/energy_uj
```

Security & Persistence:

This configuration uses group-based permissions (mode 0440, owner root:powercap) to grant read-only access to RAPL powercap files exclusively to users in the powercap group. Permissions are automatically reapplied during boot via the sysfs configuration.

Verify access with command below:

```
cat /sys/class/powercap/intel-rapl/intel-rapl:0/energy_uj
```

If this command prints a number without requiring sudo, the setup was successful.

Install Intel® ESQ

Install Intel® ESQ from GitHub*:

```
uv tool install --force --refresh git+https://github.com/open-edge-platform/edge-system-qualification.git@main
```

Verify that ESQ is working correctly.

```
esq -version
```

Run Intel® ESQ

Clean Qualification Environment

Before running a new version of ESQ, run the following command to clean up any previously created esq_data folder:

```
esq clean --all
```

This ensures that leftover data from previous ESQ versions does not interfere with the new installation. If you have uninstalled ESQ but the esq_data folder still exists, remove it using the above command before running any new ESQ commands. Otherwise, ESQ may not work as expected. This is crucial to avoid any conflicting issues during new ESQ runtime.

Start Qualification

To initiate system qualification for AI Edge Systems, run the command **esq run** to generate a test report:

```
esq run
```

By default, this command will run the following

- Run qualification profiles (always included)
- Run vertical profiles
- Collect metrics and generate a test report

```
$ esq run
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Default: Run qualification and vertical profiles
Option:  Run qualification profiles only (skip vertical profiles)
Tip: Use --all flag to perform full system performance benchmarking

Vertical profiles:
 - profile.vertical.manufacturing
 - profile.vertical.metro
 - profile.vertical.retail
```
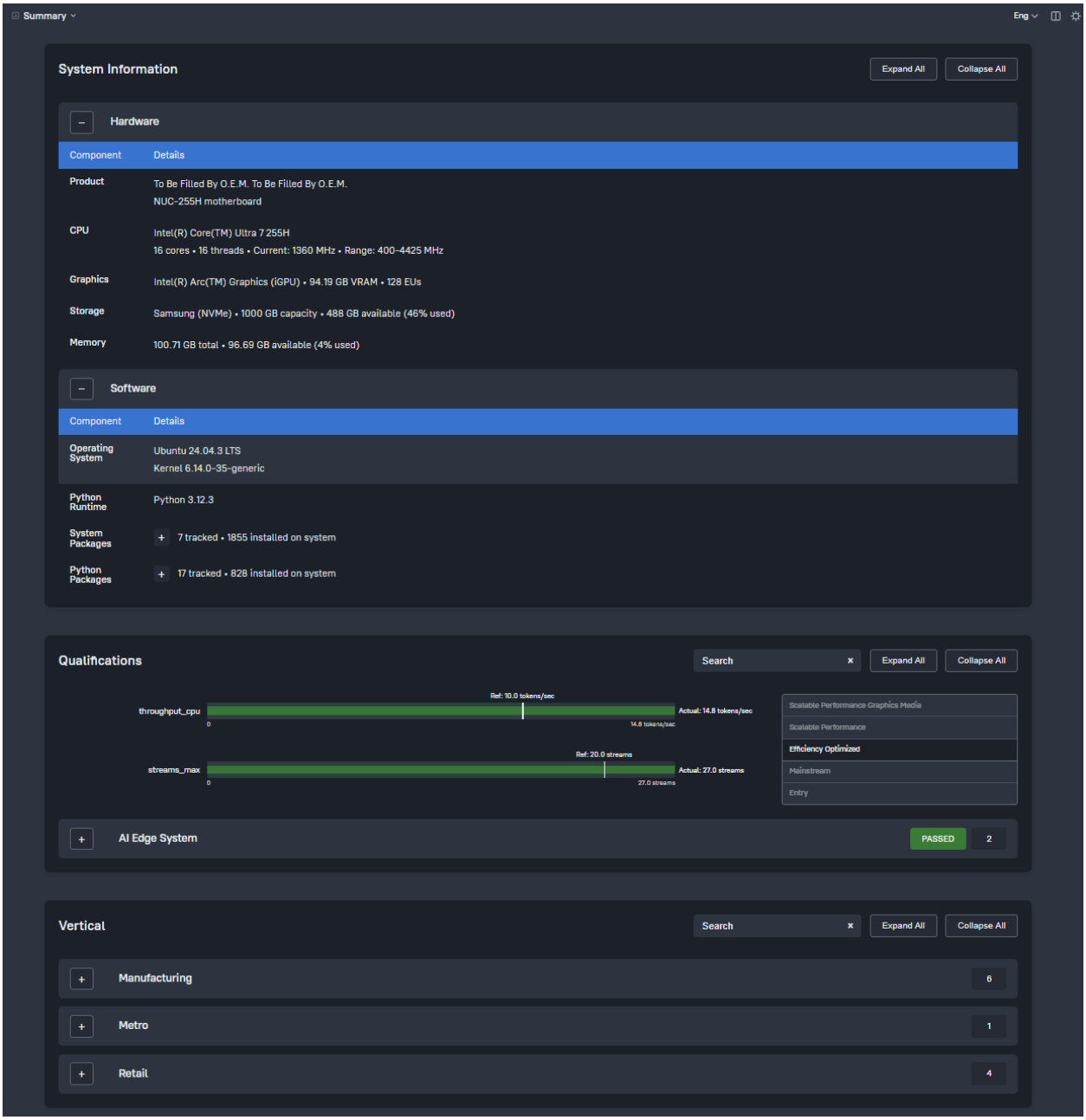

Qualification Results

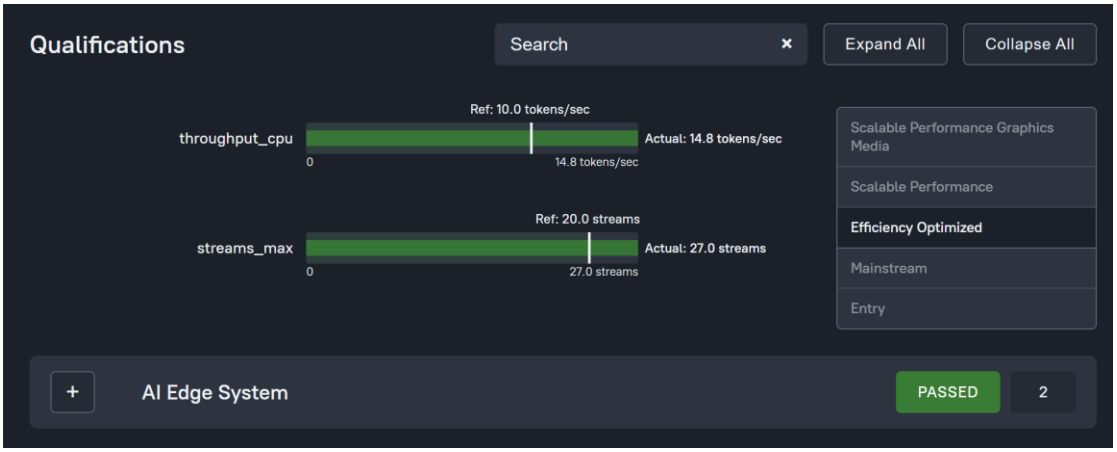
When ESQ test is completed successfully, a report is generated with sections like system summary, qualification status and individual vertical use-case benchmarking. Each section can be expanded to find details, test parameters and errors making it easy to spot both successful areas and those needing further analysis.



Qualification Submission Criteria

For AI Edge System catalog inclusion eligibility, submit your ESQ test report that passed AI Edge System qualification as shown below. The report should clearly indicate successful qualification status, with all mandatory test profiles completed and no critical errors.

To ensure your submission meets the evaluation criteria, your report must include all required sections, such as the system summary, qualification status, and vertical benchmarking results.



To submit ESQ reports go to : https://builders.intel.com/ecosystem-engagement/solution-hub/systems/qualification-form or intel.edge.ai.systems@intel.com

Should your system be impacted by performance or benchmarking issues, proceed to contact support via Intel Premier Support

Support

Support is available for Intel partners via Intel Premier Support
For correct case disposition, please select the following products and categories.

- Product “Intel® Edge Software Recipes”
- Category as “Software/Driver/OS”
- Sub-Category as “Intel® Edge System Qualification”

Additional Reference

Drivers and Scripts

For detailed information about system drivers, see the Edge Developer Kit Reference Scripts documentation.

Proxy Setup

If you are working in an Intel network environment, your target system needs the following setup.

System Proxy

Verify system proxies have been correctly configured.

```
$ cat /etc/environment
```

To update, simply use vi or vim command to add the following proxy.

```
http_proxy="http://proxy.example.com:3128"
https_proxy="http://proxy.example.com:3128"
no_proxy="localhost,127.0.0.1, 127.0.0.0/8”
HTTP_PROXY="http://proxy.example.com:3128"
HTTPS_PROXY="http://proxy.example.com:3128"
NO_PROXY="localhost,127.0.0.1, 127.0.0.0/8"
```

Docker Proxy

This file is a "drop-in" configuration that allows you to add or override settings for the docker.service without directly modifying the main service file, a standard method for configuring the Docker daemon to work within a network that uses an explicit proxy.

1. **Edit docker service proxy setting file:**

```
sudo vi /etc/systemd/system/docker.service.d/http-proxy.conf
```

2. **Add Docker Daemon Proxy Settings:** Replace the example URLs with your proxy details and save.

```
[Service]
Environment="HTTP_PROXY=http://proxy.example.com:8080/"
Environment="HTTPS_PROXY=http://proxy.example.com:8080/"
Environment="NO_PROXY=localhost,127.0.0.1,docker-registry.local,10.0.0.0/8"
```

3. **Update Docker Client Proxy Configurations:** Create ~/.docker folder and create config.json file.

```
mkdir -p ~/.docker
vi ~/.docker/config.json
```

Add details to as below into **config.json** and save file.

```
{
 "proxies": {
  "default": {
   "httpProxy": "http://proxy-dmz.intel.com:912",
   "httpsProxy": "http://proxy-dmz.intel.com:912",
   "noProxy": "localhost,127.0.0.0/8,127.0.0.1,172.17.0.1"
  }
 }
}
```

4. **Reload systemd and restart Docker:**
After saving the file, reload the systemd and client configuration to read the new drop-in file and restart the Docker service for the changes to take effect.

```
sudo systemctl daemon-reload
sudo systemctl restart docker
```

Driver Requirements

Intel® GPU and NPU tests require specific drivers. Ensure you have the latest Intel® drivers installed for your hardware configuration.

Virtualization

Running virtual machines may impact performance and hardware acceleration capabilities. For dependable outcomes, it is advisable to use a bare metal installation.

Documentation and Reference

I. Official UV documentation.
II. Official Docker* Engine installation documentation.

Skipping Vertical Benchmarking

You can run qualification option only by using the verbose option by using the command below,

```
$ esq -v run
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Default: Run qualification and vertical profiles
Option:  Run qualification profiles only (skip vertical profiles)
Tip: Use --all flag to perform full system performance benchmarking

Vertical profiles:
 - profile.vertical.manufacturing
 - profile.vertical.metro
 - profile.vertical.retail
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Skip vertical profiles? [N/y or press Enter for default]: Y
```

For complete documentation, visit: Intel® ESQ Documentation