

```
root@ip-172-31-21-157: ~/node-js-sample
git@iRLAPTOP-X0E13B6H MINGW64 ~ (master)
$ cd Downloads
git@iRLAPTOP-X0E13B6H MINGW64 ~/Downloads (master)
$ ssh -i "Mana.pem" ubuntu@ec2-13-239-247-31.ap-southeast-2.compute.amazonaws.com
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1031-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

System information as of Mon Aug 4 06:21:04 UTC 2025

System load:  0.0          Temperature:  -273.1 C
Usage of /:   34.6% of 6.71GB    Processes:    112
Memory usage: 31%           Users logged in: 0
Swap usage:   0%             IPv4 address for ens5: 172.31.21.157

Expanded Security Maintenance for Applications is not enabled.

38 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

*** System restart required ***
Last login: Fri Jul 25 05:38:50 2025 from 49.43.227.212
ubuntu@ip-172-31-21-157:~$ sudo -i
root@ip-172-31-21-157:~# sudo apt install -y nodejs git
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.43.0-1ubuntu7.3).
git set to manually installed.
The following additional packages will be installed:
  libcares2 libnode109 node-acorn node-busboy node-cjs-module-lexer node-undici node-xtend nodejs-doc
Suggested packages:
  npm
The following NEW packages will be installed:
  libcares2 libnode109 node-acorn node-busboy node-cjs-module-lexer node-undici node-xtend nodejs
  nodejs-doc
0 upgraded, 9 newly installed, 0 to remove and 38 not upgraded.
Need to get 16.1 MB of archives.
After this operation, 70.4 MB of additional disk space will be used.
Get:1 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu noble/main amd64 libcares2 amd64 1.27.0-1.0ubuntu1 [73.7 kB]
Get:2 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 node-xtend all 4.0.2-3 [8902 B]
Get:3 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 nodejs amd64 18.19.1+dfsg-6ubuntu5 [306 kB]
Get:4 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 node-acorn all 8.8.1+ds+~cs25.17-7-2 [115 kB]
Get:5 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 node-cjs-module-lexer all 1.2.2+dfsg-1 [32.1 kB]
```

```
root@ip-172-31-21-157: ~/node-js-sample
No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-21-157:~# git clone https://github.com/heroku/node-js-sample.git
Cloning into 'node-js-sample'...
remote: Enumerating objects: 417, done.
remote: Total 417 (delta 0), reused 0 (delta 0), pack-reused 417 (from 1)
Receiving objects: 100% (417/417), 218.64 KiB | 19.88 MiB/s, done.
Resolving deltas: 100% (64/64), done.
root@ip-172-31-21-157:~# cd node-js-sample
root@ip-172-31-21-157:~/node-js-sample# npm install
Command 'npm' not found, but can be installed with:
apt install npm
root@ip-172-31-21-157:~/node-js-sample# apt install npm
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu build-essential bzip2 cpp cpp-13
  cpp-13-x86-64-linux-gnu cpp-x86-64-linux-gnu dpkg-dev eslint fakeroot fontconfig-config
  fonts-dejavu-core fonts-dejavu-mono g++ g++-13 g++-13-x86-64-linux-gnu g++-x86-64-linux-gnu gcc
  gcc-13 gcc-13-base gcc-13-x86-64-linux-gnu gcc-x86-64-linux-gnu gyp handlebars javascript-common
  libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libao3 libasan8
  libatomic1 libauthen-sasl-perl libbinutils libc-dev-bin libc-devtools libc6-dev libc6i-0
  libc6n-perl libcrypt-dev libcrypt-nb00 libcrypto libdata-dump-perl libde265-0 libdeflate0
  libdpkg-perl libdrm-andgpl libdrm-intel1 libdrm-nouveau2 libdrm-radeon1 libegl-mesa0 libegl1
  libencode-locale-perl libfakeroot libfile-basedir-perl libfile-desktopentry-perl
  libfile-fcntllock-perl libfile-listing-perl libfile-mimeinfo-perl libfont-afm-perl libfontconfig1
  libgfort1 libgcc-13-dev libgd3 libgd-pixbuf-2.0-0 libgd-pixbuf2.0-bin libgd-pixbuf2.0-common
  libgl1 libgl1-mesa-dri libglapi-mesa libgles2 libglvnd0 libglx-mesa0 libglx0
  libgomp1 libgprofng0 libheif-plugin-aomdec libheif-plugin-aomenc libheif-plugin-libde265 libheif1
  libhtml-form-perl libhtml-format-perl libhtml-parser-perl libhtml-tagset-perl libhtml-tree-perl
  libhttp-cookies-perl libhttp-daemon-perl libhttp-date-perl libhttp-message-perl
  libhttp-negotiate-perl libhwloc0 libice6 libio-html-perl libio-socket-ssl-perl libio-stringy-perl
  libipc-system-simple-perl libis123 libltdl libltdl0 libjpeg-turbo8 libjpeg8 libjs-async
  libjs-events libjs-inherits libjs-is-typedarray libjs-prettify libjs-regenerate libjs-source-map
  libjs-sprintf-js libjs-typedarray-to-buffer libjs-util liblerc4 libllvm19 liblsan0
  liblw-mediatypes-perl liblw-protocol-https-perl libmailtools-perl libmpc3 libnet-dbus-perl
  libnet-http-perl libnet-smtp-ssl-perl libnet-ssleay-perl libnode-dev libnotify-bin libnotify4
  libobjc4 libobjc2-10 libofrml libohash0 libossp-uuid libpango1.0 libpango1.0-dev libpangocairo-1.2-dev
  libpie-ixhash-perl libtiff6 libtinfo5 libtiny-perl libtins2 libubsan1 liburi-perl
  libuv1-dev libvulkan1 libwayland-client0 libwayland-server0 libwebp7 libwww-perl
  libwww-robotrules-perl libx11-protocol-perl libx11-xcb1 libxaw7 libxcb-dri2-0 libxcb-dri3-0
  libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-xfixes0
  libxcomposite1 libxcursor1 libxf86-dri libxft2 libxi6 libxinerama1 libxkbfile1 libxml-parser-perl
  libxml-twig-perl libxml-xpathengine-perl libxmu6 libxpm4 libxrandr2 libxrender1 libxshmfence1
  libxt6t64 libxtst6 libxv1 libxxf86dga1 libxxf86vm1 linux-libc-dev lto-disabled-list make
  manpages-dev mesa-libgallium mesa-vulkan-drivers node-abbrev node-agent-base node-ajv
  node-ajv-keywords node-amproject-remapping node-ansi-escapes node-ansi-regex node-ansi-styles
  node-anymatch node-argv node-archy node-are-we-there-yet node-argparse node-arrify node-assert
  node-async node-async-each node-auto-bind node-babel-helper-declare-property-reference
  node-babel-plugin-add-module-exports node-babel-plugin-lodash node-babel-plugin-polyfill-corejs2
  node-babel-plugin-polyfill-corejs3 node-babel-plugin-polyfill-regenerator node-babel7
  node-babel7-runtime node-balanced-match node-base node-base64-js node-binary-extensions
  node-brace-expansion node-braces node-browserslist node-builtins node-cache node-cache-base
  node-camelcase node-can-use-lite node-chalk node-chokidar node-chownr node-chrome-trace-event
  node-ci-info node-cli-boxes node-cli-cursor node-cli-table node-cli-truncate node-clui node-clone
  node-clone-deep node-collection-visit node-color-convert node-color-name node-colors node-columnify
  node-commander node-commondir node-concat-stream node-console-control-strings
```

```
root@ip-172-31-21-157: ~/node-js-sample
Scanning processes...
Scanning linux images...

Pending kernel upgrade!
Running kernel version:
6.8.0-1031-aws
Diagnostics:
  The currently running kernel version is not the expected kernel version 6.14.0-1010-aws.

Restarting the system to load the new kernel will not be handled automatically, so you should consider
rebooting.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-21-157:~/node-js-sample# node index.js
node:internal/modules/cjs/loader:1137
    throw err;
    ^

Error: Cannot find module 'express'
Require stack:
- /root/node-js-sample/index.js
   at Module._resolveFilename (node:internal/modules/cjs/loader:1134:15)
   at Module._load (node:internal/modules/cjs/loader:975:27)
   at Module.require (node:internal/modules/cjs/loader:1225:19)
   at require (node:internal/modules/helpers:177:18)
   at Object.<anonymous> (/root/node-js-sample/index.js:1:15)
   at Module._compile (node:internal/modules/cjs/loader:1356:14)
   at Module._extensions..js (node:internal/modules/cjs/loader:1414:10)
   at Module.load (node:internal/modules/cjs/loader:1197:32)
   at Module._load (node:internal/modules/cjs/loader:1013:12)
   at Function.executeUserEntryPoint [as runMain] (node:internal/modules/run_main:128:12) {
  code: 'MODULE_NOT_FOUND',
  requireStack: [ '/root/node-js-sample/index.js' ]
}

Node.js v18.19.1
root@ip-172-31-21-157:~/node-js-sample# npm install express
npm WARN EBADENGINE Unsupported engine {
  npm WARN EBADENGINE   package: 'node-js-sample@0.2.0',
  npm WARN EBADENGINE   required: { node: '4.0.0' },
  npm WARN EBADENGINE   current: { node: 'v18.19.1', npm: '9.2.0' }
}

added 69 packages, and audited 70 packages in 3s

14 packages are looking for funding
  run npm fund for details

found 0 vulnerabilities
root@ip-172-31-21-157:~/node-js-sample# node index.js
Node app is running at localhost:5000
```

```
13.239.247.31:5000 x +
< -> C Not secure http://13.239.247.31:5000
Hello World!
```

```
ubuntu@ip-172-31-21-157:~$ ssh -i "mana.pem" ubuntu@ec2-13-239-247-31.ap-southeast-2.compute.amazonaws.com
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1031-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Mon Aug 4 06:37:32 UTC 2025

System load:  0.0          Temperature:   -273.1 C
Usage of /:   46.2% of 6.71GB Processes:      116
Memory usage: 36%          Users logged in: 1
Swap usage:   0%           IPv4 address for ens5: 172.31.21.157

Expanded Security Maintenance for Applications is not enabled.

38 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

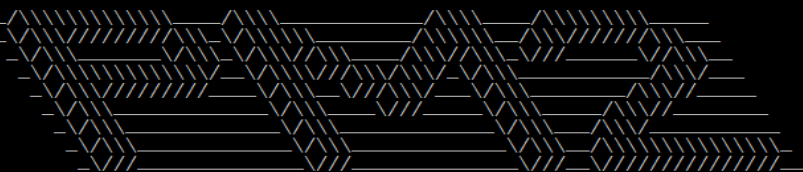
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

*** System restart required ***
Last login: Mon Aug 4 06:21:05 2025 from 49.43.233.193
ubuntu@ip-172-31-21-157:~$ sudo -i
root@ip-172-31-21-157:~# sudo npm install -g pm2

added 135 packages in 8s

13 packages are looking for funding
  run npm fund for details
root@ip-172-31-21-157:~#
```

```
root@ip-172-31-21-157:~# pm2 start index.js
```



Runtime Edition

PM2 is a Production Process Manager for Node.js applications
with a built-in Load Balancer.

Start and Daemonize any application:
`$ pm2 start app.js`

Load Balance 4 instances of api.js:
`$ pm2 start api.js -i 4`

Monitor in production:
`$ pm2 monitor`

Make pm2 auto-boot at server restart:
`$ pm2 startup`

To go further checkout:
<http://pm2.io/>

```
[PM2] Spawning PM2 daemon with pm2_home=/root/.pm2
[PM2] PM2 Successfully daemonized
```

```
root@ip-172-31-21-157:~# pm2 startup
[PM2] Init System found: systemd
Platform systemd
Template
[Unit]
Description=PM2 process manager
Documentation=https://pm2.keymetrics.io/
After=network.target

[Service]
Type=forking
User=root
LimitNOFILE=infinity
LimitNPROC=infinity
LimitCORE=infinity
Environment=PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/snap/bin:/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin
Environment=PM2_HOME=/root/.pm2
PIDFile=/root/.pm2/pm2.pid
Restart=on-failure

ExecStart=/usr/local/lib/node_modules/pm2/bin/pm2 resurrect
ExecReload=/usr/local/lib/node_modules/pm2/bin/pm2 reload all
ExecStop=/usr/local/lib/node_modules/pm2/bin/pm2 kill

[Install]
WantedBy=multi-user.target

Target path
/etc/systemd/system/pm2-root.service
Command list
[ systemctl enable pm2-root ]
[PM2] Writing init configuration in /etc/systemd/system/pm2-root.service
[PM2] Making script booting at startup...
[PM2] [-] Executing: systemctl enable pm2-root...
Created symlink /etc/systemd/system/multi-user.target.wants/pm2-root.service → /etc/systemd/system/pm2-root.service.
[PM2] [v] Command successfully executed.

+-----+
[PM2] Freeze a process list on reboot via:
$ pm2 save

[PM2] Remove init script via:
$ pm2 unstartup systemd
```

```
$ pm2 save
[PM2] Remove init script via:
$ pm2 unstartup systemd
root@ip-172-31-21-157:~# pm2 save
[PM2] Saving current process list...
[PM2] [WARN] PM2 is not managing any process, skipping save...
[PM2] [WARN] To force saving use: pm2 save --force
```