

Intel Atom® Processor E3900 Series/ Intel® Celeron® Processor N3350/ Intel® Pentium® Processor N4200 on Yocto Project* Board Support Package with Intel® System Studio

Release Notes

August 2017

MR3.1 Release



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Intel Atom® Processor E3900 Series on Yocto Project* BSP
with Intel® System Studio
Release Notes



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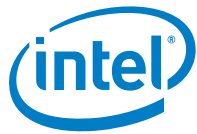
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Revision History

Date	Revision	Description
August 2017	1.0	Initial Release (MR3.1)

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1.0 Introduction

This document describes general release information for Intel® System Studio package for Intel Atom® Processor E3900 Series (formerly known as Apollo Lake-I) on the Yocto Project* Board Support Package (BSP). Intel® System Studio. Key tools are provided for embedded, and system development, including a C++ compiler, optimization libraries, power and performance analyzers (Intel® SoC Watch and Intel® VTune™ Amplifier), debug and trace capabilities, and more.

Installation instructions are provided for the Intel® System Studio package for Intel Atom® Processor E3900 Series, and integrating its Intel® System-on-a-Chip (SoC) Watch, Intel® VTune™ Amplifier, and Intel® Integrated Performance Primitives (Intel® IPP) components into the Yocto Project* BSP.

1.1 Terminology

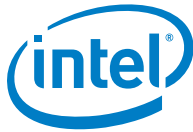
Table 1. Terminology

Term	Description
BSP	Board Support Package
Intel® IPP	Intel® Integrated Performance Primitives
SoC	System-on-a-Chip
VIP	Intel® Validation Internet Portal

1.2 Reference Documents

Table 2. Reference Documents

Document	Document No./Location
<i>Intel Atom® E3900 BSP for Yocto Project*</i>	https://github.com/01org/iotg-yocto-bsp-public/tree/e3900/master
<i>Intel Atom® Processor E3900 Series/Intel® Celeron® Processor N3350/Intel® Pentium® Processor N4200 Best Known Configuration (BKC) for Yocto Project*</i>	Contact your Intel Representative



2.0 Product Features

The following are features of Intel® System Studio, and its Intel® SoC Watch, Intel® VTune™ Amplifier, and Intel® Integrated Performance Primitives (Intel® IPP) components.

2.1 Product Features

Feature	Description
Intel® System Studio	Intel System Studio is a comprehensive tool suite for system and embedded development. It includes a C++ compiler, optimization libraries, power and performance analyzers (Intel® SoC Watch and Intel® VTune™ Amplifier), debug and trace capabilities, and more.
Intel® SoC Watch for Linux*	Intel® SoC Watch is the data collector for power-related data including C/P/D/S-state residencies, temperature, energy consumption, and the idle and wakeup behavior. The collected data is used by the Intel Energy Profiler. Use the Intel Energy Profiler bundled with Intel VTune™ Amplifier for Systems to visualize power-related data and understand how to improve efficiency of energy usage.
Intel® VTune Amplifier for Systems	Intel® VTune™ Amplifier for Systems provides an integrated performance analysis and tuning environment with graphical user interface that helps you analyze code performance on systems with IA-32 or Intel® 64 architectures. The target collector is used to collect the performance data on the target Linux* systems. Install the Intel® VTune Amplifier for Systems from Intel® System Studio product on the host system for the remote data collections.
Integrated Performance Primitives (Intel® IPP)	Intel® IPP is the optimized software libraries for image processing, signal processing, and data processing (data compression/decompression and cryptography) applications. The library provides over 2,500 image processing, 1,300 signal processing, 500 computer vision, and 300 cryptography primitives optimized for Intel® Atom™ processors.
meta-intel-proprietary-iss	The recipes provide the building steps on the Intel® SoC Watch package and Intel® VTune Amplifier performance data collectors for Linux. The recipes also includes the building steps on adding Intel® IPP for Intel Atom® Processor E3900 Series on Yocto, which can support native development at Yocto target system.

2.2 New Features

- Intel® System Studio is now available for free for Intel Atom® Processor E3900 Series developers.

Check the "[How to Install This Release](#)">>" [Getting Intel® System Studio Package](#)" part of the documentation to learn more information.

- Added the new recipes on adding the Intel® IPP into the target. These recipes support the native development with Intel® IPP at target.



- The Intel® SoC Watch is updated to v2.3.1. The Intel® VTune version is updated to 2017 update 3. Both are available from Intel® System Studio 2017 update 3 release.

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3.0 Known Issues

None

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4.0 ***Fixed Issues***

None.

4.1 **Limitations**

None.

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5.0 *Where to Find the Release*

This release is available from the Intel Atom® Processor E3900 Series technical libraries: <https://www.intel.com/content/www/us/en/embedded/products/apollo-lake/technical-library.html>.

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6.0 How to Install This Release

6.1 Getting Intel® System Studio Package

Intel® System Studio supports the cross-platform code development for Yocto Project*.

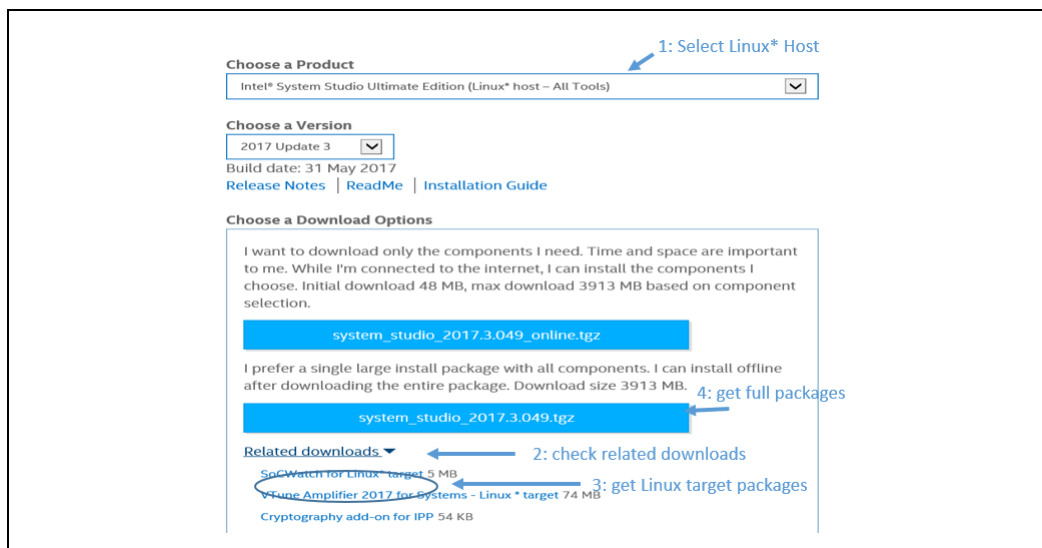
To use Intel® VTune™ Amplifier or Intel® SoC Watch, install a data collector at the target system, and their result can be viewed on the host development system.

Intel® IPP supports both native development at the target and cross-platform code at the host.

Use the following steps to get Intel® System Studio target and host packages:

1. Register Intel® System Studio for the Apollo Lake development:
visit the following Intel® System Studio for the Apollo Lake Enabling registration page to get Intel® System Studio product license:
<https://registrationcenter.intel.com/en/forms/?productid=3006>
2. An email notification will sent to your mailbox after the registration. The email contain a license file that can be used for the Intel® System Studio installation. Keep this email for future Intel® system studio installation.
3. Get the Intel® System Studio Linux target package as shown in Steps provided in [Figure 1](#):
 - a. Step 1 - Open the notification email, and click the **"Download"** bottom to go to the download page. In the download page, choose the product **"Intel® System Studio Ultimate Edition (Linux* host – All Tools)"**.
 - b. Step 2 - Check **"Related downloads"** in the download page.
 - c. Step 3 - Download the **"SocWatch For Linux* target"** and **"Vtune Amplifier 2017 for System – Linux* target"** files.

Figure 1. Intel® System Studio Linux* Target Package Install



4. Put Intel® SoC Watch and Intel® VTune Amplifier target package into a staging location.

E.g. Staging location = /home/user/rpm-binary/

The downloaded files:

```
socwatch_linux_v2.3.1.tgz
vtune_amplifier_target_linux_2017.3.0.513110.tgz
```

5. Extract the downloaded packages into the staging location:

```
$ tar xzf socwatch_linux_v2.3.1.tgz
$ tar xzf vtune_amplifier_target_linux_2017.3.0.513110.tgz
```

6. Download the Intel® System Studio full package: At the Intel® System Studio download pages, select the “single large install package with all components” to download the package (Step 4 shown in [Figure 1](#)).

Note: This step is optional if you only want integrate the data collectors for Intel® VTune™ Amplifier or Intel® SoC Watch for the target system.

Load the Intel® System Studio into a staging location:

E.g. Staging location = /home/user/rpm-binary/

Extract the downloaded package into the staging location.

```
$ tar xzf system_studio_2017.3.049.tgz
```

7. Download the file meta-intel-proprietary-iss.tar.bz2.

6.2 Getting Apollo Lake-I BSP

1. Clone a copy of the Intel Atom® E3900 Series BSP for Yocto Project* meta layer from GitHub and check out to the MR3.1 branch.



```
$ git clone https://github.com/01org/iotg-yocto-bsp-public.git
-b e3900/master
```

```
$ git checkout E3900-MR3.1
```

2. Run `setup.sh`. Choose “custom” to further customize the BSP before image build.

```
$ cd bsp-apololake-i
```

```
$ ./setup.sh
```

6.3 Integrating meta-intel-iss with Existing BSP Meta Layer

Before adding Intel system studio recipes into the BSP layers, make sure your kernel for the target Linux* has the required configuration options.

For using Intel® SoC Watch, the required kernel options are listed here:

https://software.intel.com/en-us/driver_setup_for_energy_analysis#BASIC

For using Intel® VTune™ Amplifier, the required kernel options are listed here:

https://software.intel.com/en-us/sep_driver#CONFIGURE

1. Go to the target location in the folder where the general BSP meta layer is located:

```
$ cd yocto_build/
```

2. Extract the file `meta-intel-proprietary-iss.tar.bz2` to `yocto_build` folder.

```
$ tar xzf /home/user/rpm-binary/meta-intel-proprietary-iss.tar.bz2
```

3. Go to `build/conf/` folder:

```
$ cd build/conf/
```

4. Edit the `bblayers.conf` to include `meta-intel-iss` layer:

```
$ vim bblayers.conf Add the path of meta-intel-iss to BBLAYERS.
```

5. Edit the `local.conf` to include the path where you have placed your downloaded RPM binaries.

```
$ vim local.conf
```

Add the following line at the top of `local.conf` file.

```
RPM_PATH=''<full_path_to_where_you_have_placed_the_downloaded_packages>''
```

For example,

```
RPM_PATH='' /home/user/rpm-binary''
```

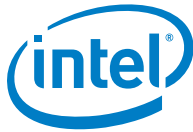
6. Edit the `local.conf` to let the compiler know you wanted to install Intel® VTune Amplifier and Intel® SoC Watch binaries.

```
$ vim local.conf
```

7. For installing VTune target, add the following line:

```
IMAGE_INSTALL_append = `` intel-iss-vtune-target''
```

8. For installing Intel® SoC Watch, add the following line:



```
IMAGE_INSTALL_append = `` intel-iss-socwatch-target``
```

9. Edit the local.conf to add Intel® IPP into the BSP layers:

Note: This step is optional depending on if you want to use Intel® IPP library for the native development at the target. Adding Intel® IPP recipes into BSP layers will include Intel® IPP library into the target platform for native development. These libraries will take about 600 Megabytes at target systems.

```
$ vim local.conf
```

add the following line:

```
IMAGE_INSTALL_append = intel-iss-ipp``
```

10. You are now ready to build your image with the Intel® system studio components. Go up one level above to build/.

```
$ cd ..
```

11. Prepare environment to run bitbake command.

```
$ source ../oe-init-build-env .
```

12. Start the image compilation.

```
$ bitbake core-image-sato
```

With a successful build, you will find the Intel® SoC Watch is installed in the /opt/intel/socwatch folder on target system. The Intel® VTune Amplifier target collectors are installed in the /opt/intel folder as well. If IPP is selected, it is installed /opt/intel/compilers_and_libraries folders.

6.4 Installing Intel® System Studio on Host System

1. The download URL is provided in the email you receive after registering the Intel® System Studio product as mentioned in [Section 6.1, Getting Intel® System Studio Package](#).

Note: Ignore this step if you already downloaded the Intel® System Studio product.

Note: If you are working on a Linux* host system, select and download the “Intel® System Studio Ultimate Edition (Linux* host – All Tools)”. If you are working on a Windows* host system, select and download product “Intel® System Studio Ultimate Edition (Windows* host – All Tools)”.



Figure 2. Installation of Intel® System Studio

Choose a Product

Intel® System Studio Ultimate Edition (Linux* host - All Tools)
Intel® System Studio Ultimate Edition (Windows* host - All Tools)

Choose a Version

2017 Update 3 ☒

Build date: 31 May 2017
[Release Notes](#) | [ReadMe](#) | [Installation Guide](#)

Choose a Download Options

I want to download only the components I need. Time and space are important to me. While I'm connected to the internet, I can install the components I choose. Initial download 48 MB, max download 3913 MB based on component selection.

[system_studio_2017.3.049_online.tgz](#)

I prefer a single large install package with all components. I can install offline after downloading the entire package. Download size 3913 MB.

[system_studio_2017.3.049.tgz](#)

[Related downloads](#) ▶

- For Windows* host installation, run the system_studio*.exe on windows and follow the prompted instructions to install. For Linux* host installation, extract the system_studio*.tgz file, run the install.sh or install_GUI.sh and follow the prompted instructions to install.

Refer the article <https://software.intel.com/en-us/articles/system-studio-install-prerequisites> for more information on the Intel System Studio product installation.

6.5 Intel® SoC Watch Quick Start

- On your target Linux* system, go to /opt/intel/socwatch folder:

```
$ cd /opt/intel/socwatch
```

- Insert the socwatch kernel modules into the kernel:

```
$ insmod drivers/socperf*.ko
```

```
$ insmod drivers/socwatch*.ko
```

- Setup the socwatch working environment:

```
$ source ./setup_socwatch_env.sh
```

- Start a socwatch collection:

```
$ socwatch -t 10 -f cpu -m -r vtune -o myResult
```

Read the textual file generated for power analysis or import the generated .pwr file into Intel® VTune Amplifier GUI for analysis.

- Run "socwatch -h" to check the supported collection options.

Refer to the SoCWatchUsersGuide.pdf file in the /opt/intel/socwatch folder for more helps.



6.6 Intel® VTune™ Amplifier Remote Collection Quick Start

1. Configure the password-less SSH connection from your host system to the target system - this is one time setup.

Instructions are provided in the following location:

<https://software.intel.com/en-us/node/596514>

2. On your target system, go to `/opt/intel/vtune_amplifier` folder and load the kernel modules:

```
$cd /opt/intel/vtune_amplifier*/sepd/src/  
$./insmod-sep
```

3. On your host system, launch Intel® VTune Amplifier GUI and follow the instructions from Intel® VTune Amplifier online help.

Collecting Data Remotely from the Intel® VTune Amplifier GUI, Refer to:

<https://software.intel.com/en-us/node/596594>

For more information on Intel® VTune Amplifier remote analysis workflow, Refer to:

<https://software.intel.com/en-us/node/596483>

<https://software.intel.com/en-us/get-started-with-vtune-for-systems>



7.0 Release Content

The following are the contents of this release:

`meta-intel-proprietary-iss.tar.bz2`

Meta layer for Intel® VTune™ Amplifier, Intel® SoC Watch and Intel® Integrated Performance Primitives

The Intel® System Studio product and the correlated Intel® SoC Watch package, Intel® VTune™ Amplifier target packages are available from Intel® registration center <http://registrationcenter.intel.com> after you registered the product from <https://registrationcenter.intel.com/en/forms/?productid=3006>.

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8.0 *Best Known Configuration*

8.1 Hardware

Intel Atom® Processor E3900 Series/Intel® Celeron® Processor N3350/Intel® Pentium® Processor N4200

8.2 Software

- Yocto Project* BSP MR3.1 release for Intel Atom® Processor E3900 Series/Intel® Celeron® Processor N3350/Intel® Pentium® Processor N4200.
- Intel® System Studio 2017 update 3 release.

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