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# Foreword

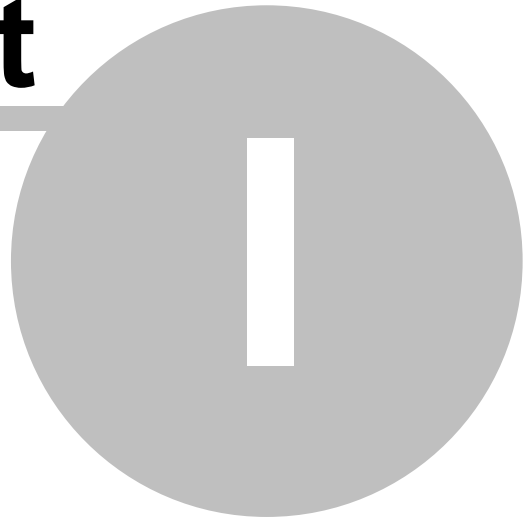
This is just another title page  
placed between table of contents  
and topics

# Top Level Intro

This page is printed before a new  
top-level chapter starts

# Part

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# 1 SysInfo

version\_number=2.08.1.0000 (Linux)  
version\_number=6.06.1.0000 (Windows)

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## Purpose

This application is intended for the gathering, output, and testing of system configurations. Capable of standalone operation via CLI interface or through the Intel(R) Modular Test Architecture Test Executive (CTC) application. Outputs consist of a configuration file "display.cfg," CTC related output and storage, and text files that indicate each device group in standalone operation.

## Runtime Environment

Linux: *lxSysInfo*  
Windows: *iwSysInfo*.

This module can be ran as a standalone application or under the control of the Intel(R) Modular Test Architecture Test Executive (CTC).

## License Agreement

All code is under the Intel(R) software License which can be found at <http://legal.intel.com>. A copy of this agreement must be included if code is released outside Intel.

## 1.1 Version Info

Windows versions use the form 6.XX.X.XXXX while Linux versions use the form 2.XX.X.XXXX

### Update Version Number Description

Date (Windows) (Linux)

Date (Windows)	Linux	Description
WW 6.06.1.12 '190000	2.08.1.0000 C	SMBIOS 3.2+ Update (Display Only), Single-socket fix HSD 2007793366, official C++11 support w/ library.
WW 6.05.1.51.4 '180000	2.07.1.0000 C	VMWare 128 DIMM patch HSD2007750327
WW 6.04.1.41 20180001	2.06.1.0000 C	Adding lxutil dependency for drive information + network additions for SCRUM pioneer bay requirement
WW 6.04.1.17 20180001	2.04.1.0000 C	AEP enabled for Windows systems
WW N/A 1 2018	2.04.0.0000 C	Inclusion of AEP (Linux) and memory functionality updates to differentiate NVDIMM, MCDRAM, and other types of memory.
TBD 10/14/6.? 2016	2.03.0.0000 C	Complete code restructure and refactoring to address stability issues and sporadic behavior.
	2.? IB	Internal release implementing testing functionality.

09/11/6.02.1.2.02.1KN Second official release adds standalone functionality, full SMBIOS, WMI &  
 2015 0001 .0001 C Linux Parsing (NIC, disk drives, storage controllers, OS)  
 09/17/6.01.1.2.01.1CJ First official release. Version 6 for Windows, version 2 for Linux.  
 2014 0001 .0002 E

#### Release Notes:

##### Ver. x.04.0.0000

Enhanced memory functionality and the introduction of NVDIMM detection on Linux systems only.

##### Ver. x.03.0.0000

Backwards compatibility for the newest version x.03.0.0000 is not officially supported; changes were necessary for the testing container structures.

However, it is possible to edit existing parameter arrays within CTC packages or the text files used previously to be compatible. The only necessary changes to be made are to assure that the existing/old parameter arrays or text files match the new column values being tested. Below is an example using the processor testing structure as an example:

#### Old Processor Parameter Example

Processor Count	Active Processors	Name	Status	Core Count	Cores Enabled	Thread Count	Max Clock Speed	Current Clock Speed
2	2	Intel Xeon	Enabled	10	10	20	3200	2800

#### New Processor Parameter Example

Version	Status	Core Count	Cores Enabled	Thread Count	Max Clock Speed	Configured Clock Speed
Intel Xeon	Enabled	10	10	20	3200	2800

The primary changes in this example for version x.03.0.0000 is that the processor count and active processors has been removed. ***As long as the columns match up i.e. "Name" of the old parameter array is at position 1 where "Processor Count" used to be then the tests will function properly.***

***If there is no other option; assure that all the parameters match up with their corresponding test values if unexpected failures occur while using old files, this should be the first check performed.***

## 1.2 Installation

#### Files installed by IxSysInfo (Linux Version):

File	Description
SysInfo.txt	Text only help file
hwcls.txt	Hardware class lookup file.
SysInfo.chm	Smart help file
IxSysInfo	Module to get system information on Linux systems
IxSysInfo.ini	Enables the module to run in standalone mode
IxSysInfo.snx	Snippet file for the Intel(R) Modular Test Architecture Test Executive
libtsx64.so	Library required to run in CTC and standalone mode
libtsx64.so.2	Library required to run in CTC and standalone mode
libtsx64.so.2.19	Library required to run in CTC and standalone mode

**Files installed by iwSysInfo (Windows Version):**

<b><u>File</u></b>	<b><u>Description</u></b>
SysInfo.txt	Text only help file
SysInfo.chm	Smart help file
iwSysInfo.exe	Module to get system information on Windows systems
libts8.dll	DLL to use module without the Intel(R) Modular Test Architecture Test Executive (standalone mode)
iwSysInfo.ini	Enables the module to run in standalone mode
iwSysInfo.snx	Snippet file for the Intel(R) Modular Test Architecture Test Executive

## 1.3 Auto Configure

**Overview**

Retrieves the current system configuration populating the parameter arrays for all devices in CTC or the corresponding text files in standalone operation. These parameter array in the text files or within CTC can then be used to perform configuration validation.

**Parameter(s)****CTC:**

Individual parameter arrays for each device type on the system can be found in the left pane and will be populated after execution.

**Standalone:**

Parameter arrays are saved as .txt files and formatted using a comma delimited format after execution.

**Test Execution Time**

**Windows:** ~5 sec. *\*Varies based on system complexity and the amount of calls to WMI.*

**Linux:** ~1 sec.

## 1.4 Standalone Operation

Functionality has been implemented such that iwSysInfo and lxSysInfo can be executed from the command line.

**Files Needed**

Refer to the [Installation](#) page at the beginning of this help document. The only file that is not needed for Standalone Mode is the .snx file for both Windows and Linux.

**How To Run**

From the command line, go to the directory that contains the *Files Needed* and type the command below.

Windows command line: ***./iwSysInfo.exe <parameter>***

Linux command line: ***./lxSysInfo <parameter>***

Note: only one parameter is accepted. If the parameter field is left blank, it will default to running the display test. Acceptable parameters are given below.

Parameters	Description
<b>autocfg</b>	Runs autoconfigure. The configuration values obtained from autoconfigure are saved into txt files. Each subtest has it's own txt file with its configuration values. For example, after running autoconfigure, txt files such as osParams.txt, systemParams.txt, biosParams.txt, etc, are created in the current working directory.
<b>os</b>	Displays the current os configuration
<b>system</b>	Displays the current system configuration
<b>bios</b>	Displays the current bios configuration
<b>baseboard</b>	Displays the current baseboard configuration
<b>chassis</b>	Displays the current chassis configuration
<b>cpu</b>	Displays the current cpu configuration
<b>memory</b>	Displays the current memory configuration
<b>slot</b>	Displays the current slot configuration
<b>disk</b>	Displays the current storage device configuration
<b>storage</b>	Displays the current storage controller configuration
<b>network</b>	Displays the current network configuration
<b>ostest</b>	Runs the config checking test for os
<b>systemtest</b>	Runs the config checking test for system
<b>biostest</b>	Runs the config checking test for bios
<b>baseboardtest</b>	Runs the config checking test for baseboard
<b>chassistest</b>	Runs the config checking test for chassis
<b>cpustest</b>	Runs the config checking test for cpu
<b>memorytest</b>	Runs the config checking test for memory
<b>slottest</b>	Runs the config checking test for slot
<b>disktest</b>	Runs the config checking test for disk
<b>storage test</b>	Runs the config checking test for storage
<b>network test</b>	Runs the config checking test for network
<b>display</b>	Displays the current configuration
<b>testdisplay</b>	Displays the current configuration and runs all config checking subtests

## 1.5 Device Display

### Overview:

Display is a simple output to CTC or the CLI in standalone operation that will present information on a particular device or all devices by default with standalone execution.

The information gathered is primarily based on information that can be obtained via SMBIOS and as of version x.03.0.0000 the display names should correspond to those SMBIOS property names where applicable.

**\*Note: not all SMBIOS properties are represented in this application for various reasons most commonly certain fields are not populated properly or are non-existent.**

### 1.5.1 Baseboard

#### Overview

This test will display the Baseboard values of the current system.

Verbosity/Error Number = 0x00

This value can be used to filter out all baseboard related tests verbose messages; also may be present in errors to signify the test that failed.

**Properties Displayed:**

- Manufacturer
- Product
- UUID
- Version
- Serial Number
- Asset Tag

## 1.5.2 BIOS

### Overview

This test will display the BIOS values of the current system.

Verbosity/Error Number = 0x01

This value can be used to filter out all BIOS related tests verbose messages; also may be present in errors to signify the test that failed.

**Properties Displayed:**

- Vendor
- Version
- Release Date
- BIOS Release
- Firmware Release
- SMBIOS Version

## 1.5.3 Chassis

### Overview

This test will display the Chassis values of the current system.

Verbosity/Error Number = 0x02

This value can be used to filter out all system related tests verbose messages; also may be present in errors to signify the test that failed.

**Properties Displayed:**

- Type
- Version
- Serial Number
- Asset

## 1.5.4 Memory

### Overview

This test will display the Memory values of the current system.



Verbosity/Error Number = 0x04

This value can be used to filter out all memory related tests verbose messages; also may be present in errors to signify the test that failed.

**Properties Displayed:**

- Device Locator
- Bank Locator
- Manufacturer
- Device Type
- Type Detail
- Form Factor
- Part Number
- Serial Number
- Module Size
- Max Speed
- Configured Speed

**NVDIMM Properties:**

- Capability (Hex)
  - Feature is supported if bit is set*
  - Bit[0]: If 1, 1LM Mode*
  - Bit[1]: If 1, 2LM Mode*
  - Bit[2]: If 1, App Direct PM Mode*
  - Bit[3]: Reserved*
  - Bit[4]: If 1, Storage Mode*
  - Bit[5]: If 1, SubNUMA Cluster*
  - Bits[7:6]: Reserved*
- Software Management Support (Hex)
  - Bit[0] – If 1, BIOS supports changing configuration through management software. If clear, BIOS does not allow configure change through management software.*
  - Bit[1] – If 1, BIOS supports runtime interface to validate management configuration change request. Refer to BIOS runtime interface data structure.*
- Volatile Mode
  - 1LM
  - 2LM
  - Auto (2LM if DDR4+Intel NVDIMM with volatile mode present, 1LM otherwise)
- Persistent Mode
  - Disabled
  - App Direct PM Mode
  - Reserved
  - Reserved

## 1.5.5 Network

### Overview

This test will display the Network values of the current system. This device uses WMI (Windows) and system file parsing (Linux) to query system information.

Verbosity/Error Number = 0x05

This value can be used to filter out all network related tests verbose messages; also may be present in errors to signify the test that failed.

**Properties Displayed:**

- Description
- Class
- MAC Address

*\*Note: Driver and location information was removed in version x.03.0.0000 due to inconsistent, inaccurate, and slow operation (Windows); this information will remain unused until methods are improved.*

## 1.5.6 OS

### Overview

This test will display the operating system information running on the current system. This device uses WMI (Windows) and system file parsing (Linux) to query system information.

Verbosity/Error Number = 0x06

This value can be used to filter out all operating system related tests verbose messages; also may be present in errors to signify the test that failed.

**Properties Displayed:**

- Operating System
- Architecture
- Support Package (Windows) Revision (Linux)
- Version

## 1.5.7 Processor

### Overview

This test will display the Processor values of the current system.

Verbosity/Error Number = 0x03

This value can be used to filter out all processor related tests verbose messages; also may be present in errors to signify the test that failed.

**Properties Displayed:**

- Processor Socket Count
- Active Processors
- Designation
- Version
- Status
- Core Count
- Cores Enabled
- Thread Count
- Max Clock Speed
- Configured Clock Speed

### 1.5.8 PSU

#### Overview

This test will display the PSU information of the current system.

**\*Note:** This information is generally insignificant and may only be properly populated on final full rack systems.

Verbosity/Error Number = 0x07

This value can be used to filter out all PSU related tests verbose messages; also may be present in errors to signify the test that failed.

#### Properties Displayed:

- Location
- Device Name
- Manufacturer
- Serial Number
- Asset Tag Number
- Model/Part Number
- Revision Level

### 1.5.9 Slot

#### Overview

This test will display the system slot information on the current system.

Verbosity/Error Number = 0x08

This value can be used to filter out all slot related tests verbose messages; also may be present in errors to signify the test that failed.

#### Properties Displayed:

- Designation
- Type
- Usage
- Characteristic 1
- Characteristic 2

### 1.5.10 Storage Controller

#### Overview

This test will display the Storage values of the current system. This device uses WMI (Windows) and system file parsing (Linux) to query system information.

Verbosity/Error Number = 0x09

This value can be used to filter out all storage controllers related tests verbose messages; also may be present in errors to signify the test that failed.

#### Properties Displayed:

- Description
- Class

**\*Note:** Driver and location information was removed in version x.03.0.0000 due to inconsistent, inaccurate, and slow operation (Windows); this information will remain unused until methods are

improved.

## 1.5.11 Storage Device

### Overview

This test will display all storage devices present on the system. This device uses WMI (Windows) and system file parsing (Linux) to query system information.

Verbosity/Error Number = 0x0A

This value can be used to filter out all storage device related tests verbose messages; also may be present in errors to signify the test that failed.

### Properties Displayed:

- Description
- Model
- Serial Number
- Firmware Version
- Size

*\*Note: Driver and location information was removed in version x.03.0.0000 due to inconsistent, inaccurate, and slow operation (Windows); this information will remain unused until methods are improved.*

## 1.5.12 System

### Overview

This test will display the System values of the current system.

Verbosity/Error Number = 0x0B

This value can be used to filter out all system related tests verbose messages; also may be present in errors to signify the test that failed.

### Properties Displayed:

- Manufacturer
- Product Name
- Version
- Serial Number
- Wake-Up Type
- SKU Number
- Family

## 1.6 Device Testing

### Overview:

The testing is a comparison between values stored in the device parameter arrays in CTC or within the text files generated during standalone execution. The testing will prompt with an error when any mismatching is present.

### 1.6.1 Baseboard

#### Overview

This test will compare the Baseboard values of the current system with the Baseboard values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

#### Parameter(s) Container

**Standalone:** baseboardParams.txt

Example:

Manufacturer,Product,Version,SerialNumber  
LENOVO,20HAS02500,SDK0J40697 WIN,W1KS76810GV

**CTC:** Baseboard Params

Example:

Manufacturer	Product	Version	Serial Number
LENOVO	20HAS0250	SDK0J40697 WIN	W1KS76810GV

#### Test Execution Time

< 1 second

### 1.6.2 BIOS

#### Overview

This test will compare the BIOS values of the current system with the BIOS values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

#### Parameter(s) Container

**Standalone:** biosParams.txt

Example:

BIOSVersion,BIOSVendor,ReleaseDate,ReleaseVersion,FirmwareVersion,  
SMBIOSVersion  
1.21,LENOVO,04/19/2017,1.21,1.11,3.00

**CTC:** BIOS Params

Example:

BIOS Version	BIOS Vendor	Release Date	Release Version	Firmware Version	SMBIOS Version
1.21	LENOVO	04/19/2017	1.21	1.11	3.00

#### Test Execution Time

< 1 second

### 1.6.3 Chassis

#### Overview

This test will compare the Chassis values of the current system with the Chassis values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

#### Parameter(s) Container

**Standalone:** chassisParams.txt

Example:

Type,PartNumber,SerialNumber,Asset  
Notebook,None,R90NJQYF,No Asset Information

**CTC:** Chassis Params

Example:

Type	Version	Serial Number	Asset Tag
Notebook	None	R90NJQYF	No Asset Information

**Test Execution Time**

< 1 second

## 1.6.4 Memory

### Overview

This test will compare the Memory values of the current system with the Memory values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

### Parameter(s) Container

**Standalone:** memoryParams.txt

Example:

Manufacturer,Locator,Bank,Part Number,Serial Number,Module Size,Rated Speed,  
Configured Speed  
SK Hynix,ChannelA-DIMM0,BANK 0,HMA81GS6AFR8N-  
UH,29A93204,8GB,2133MHz,2133MHz  
SK Hynix,ChannelB-DIMM0,BANK 2,HMA81GS6AFR8N-  
UH,294C2B03,8GB,2133MHz,2133MHz

**CTC:** Memory Params

Example:

Manuf acturer	Locato r	Bank	Part Number	Serial Number	Modul e Size	Rated Speed	Config ured Speed
SK Hynix	Chann elA- DIMM 0	BANK 0	HMA81GS6AFR8N-UH	29A93204	8GB	2133M Hz	2133M Hz
SK Hynix	Chann elB- DIMM 0	BANK 2	HMA81GS6AFR8N-UH	294C2B03	8GB	2133M Hz	2133M Hz

**Test Execution Time**

< 1 second

## 1.6.5 Network Interfaces

### Overview

This test will compare the Network values of the current system with the Network values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

### Parameter(s) Container

**Standalone:** networkParams.txt

Example:

Description,Class,MAC,Driver Version,Location  
Intel(R) Ethernet Connection (4) I219-LM,Ethernet 802.3,54:EE:75:D4:EE:0B,,

Bluetooth Device (Personal Area Network),Ethernet 802.3,F8:59:71:33:A6:39,,

**CTC:** Network Params

Example:

Description	Class	MAC	Driver Version	Device ID
Intel(R) Ethernet Connection (4) I219-LM	Ethernet 802.3	54:EE:75:D4:EE:0B		
Bluetooth Device (Personal Area Network)	Ethernet 802.3	F8:59:71:33:A6:39		

\*Note: Driver Version & Device ID are still present but are not tested; place holders

#### Test Execution Time

< 1 second

### 1.6.6 NVDIMM (AEP)

#### Overview

This test will compare the NVDIMM (AEP) parameter values of the current system with the NVDIMM values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

Reference "Device Display -> Memory" for information on decoding the Capability and SW Capability if needed or to reference what modes are possible.

#### Parameter(s) Container

**Standalone:** aepParams.txt

Example:

AEP Enabled,Active Mode,Persistent Mode,Capability (Hex),SW Capability(Hex)  
Yes,1LM,App-Direct,0x3F,0x01

**CTC:** AEP Params

Example:

AEP Enabled	Active Mode	Persistent Mode	Capability (Hex)	SW Capability (Hex)
Yes	1LM	App-Direct	0x3F	0x01

#### Test Execution Time

< 1 second

### 1.6.7 OS

#### Overview

This test will compare the OS values of the current system with the OS values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

#### Parameter(s) Container

**Standalone:** osParams.txt

Example:

OS,Architecture,SP/Revision,Version  
 Microsoft Windows 10 Enterprise,64-bit,0.0,10.0.14393

**CTC:** OS Params

Example:

OS	Architecture	SP/Revision	Version
Microsoft Windows 10 Enterprise	64-bit	0.0	10.0.14393

### Test Execution Time

< 1 second

## 1.6.8 Processor

### Overview

This test will compare the Processor values of the current system with the Processor values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

### Parameter(s) Container

**Standalone:** processorParams.txt

Example:

Version,Status,Core Count,Cores Enabled,Thread Count,Max Clock Speed,  
 Configured Clock Speed  
 Intel(R) Core(TM) i5-7300U CPU @ 2.60GHz,Enabled,2,2,4,2700MHz,2600MHz

**CTC:** Processor Params

Example:

Version	Status	Core Count	Cores Enabled	Thread Count	Max Clock Speed	Configured Clock Speed
Intel(R) Core(TM) i5-7300U CPU @ 2.60GHz	Enabled	2	2	4	2600MHz	2600MHz

### Test Execution Time

< 1 second

## 1.6.9 Slot

### Overview

This test will compare the Slot values of the current system with the Slot values of the auto configured system, i.e. the values that were stored in the parameter arrays during the autoconfiguration step.

### Parameter(s) Container

**Standalone:** slotParams.txt

Example:

Designation,Type,Usage,Characteristic1,Characteristic2  
 Media Card Slot,Other,Available,,Hot-plug devices  
 SimCard Slot,Other,Available,,

**CTC:** Slot Params

Example:

Designation	Type	Usage	Characteristic 1	Characteristic 2
-------------	------	-------	------------------	------------------



Media Card Slot	Other	Available		Hot-plug devices
SimCard Slot	Other	Available		

**Test Execution Time**

&lt; 1 second

**1.6.10 Storage Controllers****Overview**

This test will compare the Storage values of the current system with the Storage values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

**Parameter(s) Container****Standalone:** storageControllerParams.txt

Example:

Description,Device Class,Location,Status,Driver Version,Device ID  
 MicrosoftStorageSpacesController,,,OK,,  
 StandardNVMeExpressController,,,OK,,

**CTC:** Storage Controller Params

Example: Below is an example of some parameters for devices that aren't always populated i.e. Class/Location

Description	Class	Location	Status	Driver Version	Device ID
MicrosoftStorageSpacesController			OK		
StandardNVMeExpressController			OK		

Note: Driver Version & Device ID are still present but are not tested; place holders

**Test Execution Time**

&lt; 1 second

**1.6.11 Storage Devices****Overview**

This test will compare the storage device values of the current system with the storage device values of the auto configured system, i.e. the values that were stored in the parameter arrays during the autoconfiguration step.

**Parameter(s) Container****Standalone:** storageDeviceParams.txt

Example:

Description,Model,Serial Number,Firmware Revision,Size  
 Disk drive,SAMSUNG MZVLW256HEHP-  
 000L7,0025\_38B5\_71B8\_1764.,4L7QCXB7,238.47 GB

**CTC:** Storage Device Params

Example:

Description	Model	Serial Number	Firmware Revision	Size
-------------	-------	---------------	-------------------	------

Disk drive	SAMSUNG MZVLW256HEHP-000L7	0025_38B5_71B8_1764.	4L7QCXB7	238.47 GB
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**Test Execution Time**

&lt; 1 second

**1.6.12 System****Overview**

This test will compare the System values of the current system with the System values of the auto configured system, i.e. the values that were stored in the parameter arrays during auto configure.

**Parameter(s) Container****Standalone:** systemParams.txt

Example:

Manufacturer,Product,Version,Serial Number,SKU Number,Family  
 LENOVO,20HAS02500,ThinkPad T570,R90NJQYF,  
 LENOVO\_MT\_20HA\_BU\_Think\_FM\_ThinkPad T570,ThinkPad T570

**CTC:** System Params

Example:

Manufacturer	Product	Version	Serial Number	SKU	Family
LENOVO	20HAS02500	ThinkPad T570	R90NJQYF	LENOVO_MT_20HA_BU_Think_FM_ThinkPad T570	ThinkPad T570

**Test Execution Time**

&lt; 1 second

Endnotes 2... (after index)

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