



## HP-UX LAN Indication Provider - CIM Indication Provider for Ethernet LAN interfaces

### Provider Overview

The HP-UX LAN Indication Provider delivers indications for events that occur on Ethernet interfaces. This provider instruments the HP\_DeviceIndication class.

Client applications can subscribe to HP\_DeviceIndication and start receiving indications based on events generated by Ethernet interfaces.

The currently supported indications are:

- Link down due to hardware failure
- Link down due to loss of connection with link partner
- Link down due to administrative actions
- Link down for unknown reasons
- Link up

### Description Requirements

The provider requires HP WBEM Services for HP-UX.

Notes for 11iv2: installation of DLPI patch PHNE\_35545 is recommended. Installation of this patch will allow the provider to give better information as to why a link state change occurred - all events from table 3 below will be possible. Without this patch, only event ID 5 from table 3 below is possible.

In addition, installation of PHNE\_35545 will allow the LAN indication provider to run without impacting the results of Critical Resource Analysis (CRA). CRA is executed before doing PCI online card replacement through SAM, olrad, or the PCI attention button.

If PHNE\_35545 is not installed and this provider is running, CRA will return a result of 'potentially data critical'. See below for how to proceed in this situation.

Notes for 11iv1: Determination of the reason a link state has changed is not available in 11iv1. In 11iv1 only event ID 5 from table 3 below is possible.

In addition, performing an Online Replace of a PCI Ethernet NIC through the SAM or PCI attention button interface will return a Critical Resource Analysis (CRA) result of 'potentially data critical'.

How to proceed an PCI online replace: Review the CRA report and determine if an online operation on the slot will be safe for the systems operation. If the output of 'lanadmin -p <ppa>' shows only 'cimprovagt' for the affected ppa's then it is safe to use the 'force' option to proceed with the operation. Note that for 11iv2 if patch PHNE\_35545 is installed there will be no impact on PCI online operations.

## Supported managed resources

Managed systems running HP WBEM Services for HP-UX. This provider only supports HP Ethernet-based LAN interface products for HP-UX.

## Setting Up This Provider

### Installing this provider

The LAN Indication Provider filesets are contained within the Software Distributor bundle WBEMP-LAN-00. The LAN Indication Provider filesets are:

- LANP-IP-RUN which contains:
  - LAN indication provider module shared library: libHPUXLANIndProviderModule.so.1 (in /opt/lanproviders/lib, and is the target of the symbolic link in /opt/wbem/providers/lib/)
- LANP-IP-RUN-CMN which contains:
  - Schema MOF file: HP\_DeviceIndication.mof (in /opt/lanprovider/mof)
  - Provider registration MOF file: HPUXLANIndicationProviderModuleR.mof (in /opt/lanprovider/mof)

The HP-UX LAN Indication Provider is registered in the "root/cimv2" namespace as an indication provider.

The LAN Indication Provider is installed by default when WBEMP-LAN-00 is installed.

The LAN Indication Provider can be disabled by running the following command:  
*cimprovider -d -m HPUXLANIndProviderModule*

### Configuring this provider

This Provider uses NetTL tool for logging various messages during execution<sup>1</sup>. For the NetTL tool, the sub-system name of this Provider is WBEMProvider-LAN. Use the *nettl* command to turn on/off the logging or set the level of messages to be logged by this Provider. The provider logs Informational and Error level messages.

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<sup>1</sup> LAN Indication Provider needs root privileges to use NetTL for logging messages. See man page *nettl* (1M) for details on how to use NetTL.

## Using This Provider

### Schema supported by this provider

This provider supports the HP\_DeviceIndication class. Tables 1 through 3 describe the properties and methods supported by the provider.

**Table 1: HP\_DeviceIndication properties**

Table 1 describes the properties of the HP\_DeviceIndication class. It has three columns. The first is the property name (including type and units), the second is the property inheritance (indicating which class or superclass defines the property), and the third is the property's value and data source. Each row describes a property.

<i>Property name</i>	<i>Property Inheritance</i>	<i>Property Value (and data source)</i>
string IndicationIdentifier	Inherited from CIM_Indication	A unique identifier for the indication. Format: "eip.sm"  Where sm is the Operating System Time stamp 's' is the value of time as an integer number of seconds since epoch 'm' is the number of microseconds .
datetime IndicationTime	Inherited from CIM_Indication	The time and date of creation of the Indication. Format: "yyyymmddhhmmss.mmmmmmsutc"
string Description	Inherited from CIM_AlertIndication	See table 3: Event Descriptions
string AlertingManagedElement	Inherited from CIM_AlertIndication	CIMObjectPath format Format: protocol://hostname:namespace.class.property="value",property="value"
uint16 AlertType	Inherited from CIM_AlertIndication	5 – Device Alert
uint16 PerceivedSeverity	Inherited from CIM_AlertIndication	0 – Unknown 2 – Information 3 – Warning 4 – Minor 5 – Major See table 3: Event Descriptions
uint16 ProbableCause	Inherited from CIM_AlertIndication	See table 3: Event Descriptions
string ProbableCauseDescription	Inherited from CIM_AlertIndication	See table 3: Event Descriptions
string[] RecommendedActions	Inherited from CIM_AlertIndication	See table 3: Event Descriptions
string EventID	Inherited from CIM_AlertIndication	See table 3: Event Descriptions
string SystemCreationClassName	Inherited from CIM_AlertIndication	CIM_ComputerSystem
datetime EventTime	Inherited from CIM_AlertIndication	The time and date the event occurred. "yyyymmddhhmmss.mmmmmmsutc"
string SystemName	Inherited from CIM_AlertIndication	Host name of the system (fully qualified if possible)
string ProviderName	Inherited from CIM_AlertIndication	"HPUXEthernetIndicationProvider"
string Summary	Inherited from HP_AlertIndication	See table 3: Event Descriptions
uint32 EventCategory	Inherited from HP_AlertIndication	12 – Network Device
uint32 EventSubCategory	Inherited from HP_AlertIndication	11 – Ethernet Port
uint32 EventThreshold	Inherited from HP_AlertIndication	Always 1

<i>Property name</i>	<i>Property Inheritance</i>	<i>Property Value (and data source)</i>
uint32 EventTimeWindow	Inherited from HP_AlertIndication	Always 0
uint32 ActualEventThreshold	Inherited from HP_AlertIndication	Always 1
uint32 ActualEventTimeWindow	Inherited from HP_AlertIndication	Always 0
boolean ClusterWideEvent	Inherited from HP_AlertIndication	Always 0
string ProviderVersion	Inherited from HP_AlertIndication	ex. "B.11.23.0706"
uint16 OSType	Inherited from HP_AlertIndication	8 – "HPUX"
string OSVersion	Inherited from HP_AlertIndication	uname() - utsname.release ex. "B.11.23"
string[] NetworkAddresses	Inherited from HP_AlertIndication	Array of IP addresses used on the system ex. {'15.13.1.1', '15.13.1.2'}
string SystemSerialNumber	Inherited from HP_AlertIndication	Retrieved from PG_ComputerSystem
string SystemModel	Inherited from HP_AlertIndication	Retrieved from PG_ComputerSystem
string SystemGUID	Inherited from HP_AlertIndication	Retrieved from PG_ComputerSystem
string UserComment	Inherited from HP_AlertIndication	NULL
string[] VariableNames	Inherited from HP_AlertIndication	{"Driver Name"}
uint16[] VariableTypes	Inherited from HP_AlertIndication	{1} – String
string[] VariableValues	Inherited from HP_AlertIndication	name of the driver claiming the interface. ex {"ixgbe"}
uint16 AlertingElementFormat	Inherited from HP_AlertIndication	2 – CimObjectPath
string HWPartNumber	Inherited from HP_HardwareIndication	ex. "AB287-60001"
string[] HWFirmwareVersion	Inherited from HP_HardwareIndication	ex. "1.1.1.1"
string HWManufacturer	Inherited from HP_HardwareIndication	ex. "Hewlett-Packard Company"
string[] HWLogicalLocation	Inherited from HP_HardwareIndication	Hardware Path of the network interface ex. "0/4/1/0"
string[] HWSerialNumber	Inherited from HP_HardwareIndication	ex. "SXT0545021"
string DeviceModel	Local to HP_DeviceIndication	ex. "HP PCI-X 133MHz 10GbE SR Fiber Adapter"
string DevicePermanentName	Local to HP_DeviceIndication	Factory assigned MAC address of the network interface ex. "0x0123456789ABC"
uint16 DevicePermanentNameFormat	Local to HP_DeviceIndication	3 – MAC Address

Note: It can be assumed properties not listed above will have their values set to NULL.

Tables 2 describe the intrinsic methods for CIM\_Indication and inherited by HPUXEthernetIndication There are no extrinsic methods within HPUXEthernetIndicationProvider. The provider registers as an indication provider.

## **Table 2: intrinsic methods for HPUXEthernetIndicationProvider**

Table 2 describes the intrinsic methods supported by this provider. It has three columns. The first is the method name, the second is a description of the provider's actions based on invoking that method, and the third is a list of any exceptions that could result from invoking the method. Each row describes a method.

<b>Method Name</b>	<b>Description</b>	<b>Exceptions Thrown</b>
EnableIndications	The provider will start delivering Indications	CIM_ERR_FAILED
DisableIndications	The provider will stop delivering Indications	None
createSubscription	No operation done	None
ModifySubscription	No operation done	None
DeleteSubscription	No operation done	None
Initialize	Initializes data	CIM_ERR_FAILED
Terminate	Free's provider resources	None

- **Indications generated by this provider**

**Table 3: Event Descriptions**

<b>Severity</b>	<b>ProbableCause</b>	<b>Description</b>	<b>CauseDescription</b>	<b>Recommended Actions</b>	<b>Event ID</b>
5 - Major	26 – LAN Error	"lan<ppa> link has gone down."	"The link has gone down due to the hardware state going down."	["Reset the interface using lanadmin -r <ppa>."] ["Replace the NIC."]	2
3 – Warning	26 – LAN Error	"lan<ppa> link has gone down."	"The link has gone down due to a lost connection with the link partner."	["If the interface does not return back to its normal operating state on its own try these other actions, in the order listed here, until the problem is resolved."] ["Verify that the link partner is operating normally."] ["Verify that the link settings on this interface are compatible with the corresponding settings on its link partner."] ["If this interface is directly connected to its link partner with a copper cable, ensure that a cross-over cable is used for speeds less than 1000 Mb/s."] ["Reset the interface using lanadmin -r <ppa>."] ["Verify that the cable from this interface to its link partner is properly connected and is not defective."] ["Replace The NIC."]	3
2 – Informational	1 – Other	"lan<ppa> link has gone down."	"The link has gone down due to a user requested reset or configuration change."	["No action is necessary. The interface should return to its normal operating state shortly."]	4

0 – Unknown	26 – LAN Error	"lan<ppa> link has gone down."	"The link has gone down for an unknown reason."	<p>["If the interface does not return back to its normal operating state on its own try these other actions, in the order listed here, until the problem is resolved."] k</p> <p>["Verify that the link partner is operating normally."]</p> <p>["Verify that the link settings on this adapter are compatible with the corresponding settings on its link partner."]</p> <p>["If this interface is directly connected to another Ethernet adapter with a copper cable, ensure that a cross-over cable is used for speeds less than 1000 Mb/s."]</p> <p>["Try resetting the card using lanadmin -r &lt;ppa&gt;."]</p> <p>["Verify that the cable from this interface to its link partner is not defective."]</p> <p>["Replace The NIC."]</p>	5
4 – Minor	26 – LAN Error	"Temporarily quiescing indications for an event."	"The event is occurring frequently and has exceeded an internal threshold."	["Follow the actions for the events that were reported recently on this interface. This event will not be reported again until the rate at which it occurs drops below an internal threshold."]	7

Severity	ProbableCause	Description	CauseDescription	Recommended Actions	Event ID
2 – Informational	1 – Other	"lan<ppa> link is now up."	"The link is now up."	["No action is necessary. The interface is operating normally."]	6

- Associations provided by this provider  
This provider does not currently support any associations.

## Links to more information

- **Additional provider documentation**

There is currently no additional documentation for this provider beyond this information. See also man pages for information on the various commands and system calls noted in the descriptions above.

- **WBEM information**

For a CIM tutorial, go to <http://www.dmf.org/education/tutorials>.  
For information about HP WBEM Services for HP-UX, see [software.hp.com](http://software.hp.com) and [hp.com](http://hp.com) (the Network and Systems Management areas).

- **Managed resource documentation**

Information regarding the HP supported HP-UX Ethernet cards can be found at <http://docs.hp.com> (the I/O cards and Networking Software section).

- **Client information**

This provider is designed to work with any WBEM aware client that subscribes and handles HP\_DeviceIndications. Please refer to client specific documentation for information on how to enable HP\_DeviceIndications.

- **Support contacts**

The HP-UX Ethernet indication provider is supported as part of WBEMP-LAN product for HP-UX.

For additional information on HP products and services, visit us at  
<http://www.hp.com>.

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