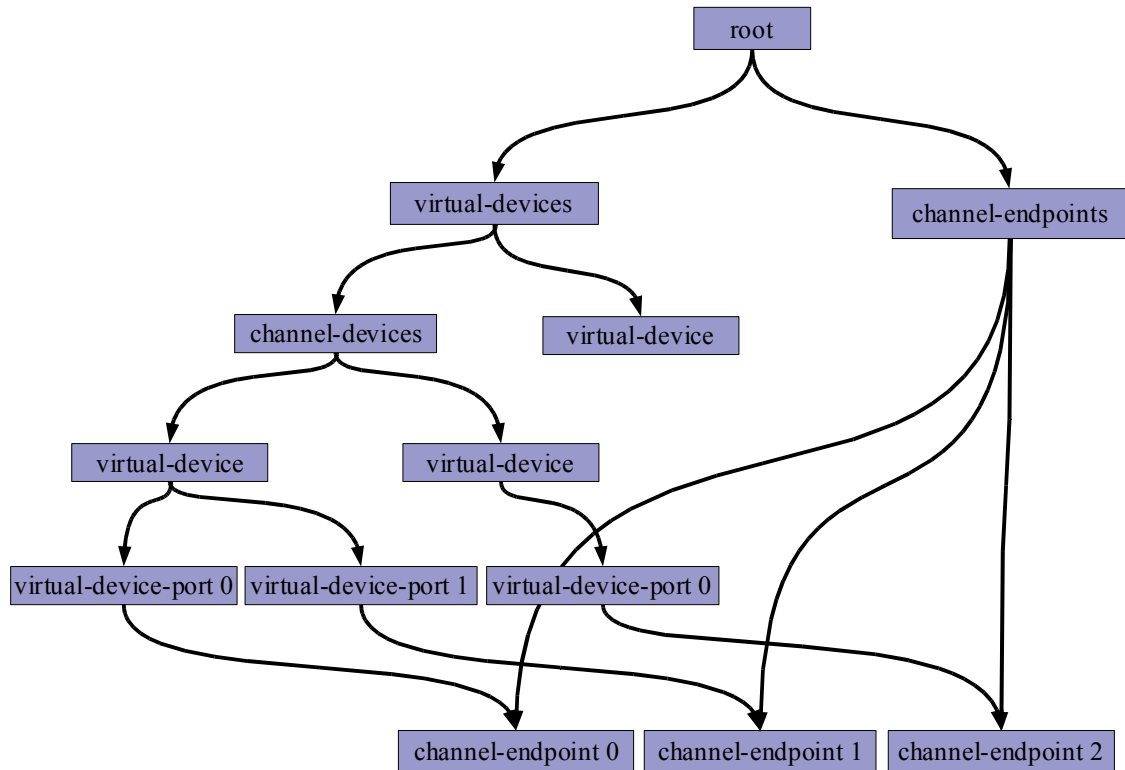


## 1 Virtual Devices

The virtual devices implemented as part of the VIO infrastructure will be represented in the guest's machine description. The devices will be represented as nodes in the MD along with their properties. This section provides an overview of the virtual device nodes, along with the device hierarchy and their properties.



### 1.1 MD information for virtual devices

All virtual devices will be represented as a node in the guest MD along with its sub-nodes as children of the `virtual-devices` node. All virtual devices nodes are of the name *virtual-device*. The name and compatible property will identify the name of the specific device and the driver associated with the device. There are two types of virtual device nodes and can be grouped into two separate classes. The first class of device nodes are ones that do not use logical domain channels (LDC) like console, and the existing platform service nodes. These will continue to appear as children of the *virtual-devices* node in the MD. All virtual-device nodes that use LDCs will belong to a class called channel devices and will be grouped under a new node called *channel-devices*. The *channel-devices* node will be a child of the the *virtual-devices* node. Some of the *virtual-device* nodes under the *channel-devices* node will have one or more child port nodes of type *virtual-device-port*. Each *virtual-device-port* node can point to one or more *channel-endpoint* nodes corresponding to the channels within that port.

### 1.1.1 Virtual devices node

Name virtual-devices  
 Category optionally required by root  
 Required subordinates -  
 25 Optional subordinates channel-devices, virtual-device

#### Description

This construction node leads directly to all the virtual devices supported within this virtual machine. The number of instances for each device can be derived by counting the number of nodes for each device.

Name	Tag	Required	Description
name	PROP_STR	yes	A string name for this node. This value is currently defined as "virtual-devices".
device-type	PROP_STR	yes	A string type for this node. This value is currently defined as "virtual-devices".
compatible	PROP_DATA	yes	An array of string names for this node. This value is currently defined as "SUNW,sun4v-virtual-devices".
cfg-handle	PROP_VAL	yes	A 64-bit unsigned integer identifying this device uniquely.

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### 1.1.2 Channel devices node

Name channel-devices  
 Category optionally required by virtual-devices  
 Required subordinates -  
 35 Optional subordinates virtual-device

#### Description

This construction node leads directly to all the channel based virtual devices supported within this virtual machine. The number of instances for each device can be derived by counting the number of nodes for each device.

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Name	Tag	Required	Description
name	PROP_STR	yes	A string name for this node. This value is currently defined as "channel-devices".
device-type	PROP_STR	yes	A string type for this node. This value is currently defined as "channel-devices".
compatible	PROP_DATA	yes	An array of string names for this node. This value is currently defined as "SUNW,sun4v-channel-devices".

Name	Tag	Required	Description
cfg-handle	PROP_VAL	yes	A 64-bit unsigned integer identifying this device uniquely.

**1.1.3 Virtual device node**

Name virtual-device  
 Category optionally required by virtual-devices, channel-devices  
 Required subordinates -  
 Optional subordinates virtual-device-port

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**Description**

This node uniquely represents an instance of a virtual device. The properties listed here applicable to all virtual devices. Each of the virtual devices may specify additional properties that are device class specific.

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**Common properties**

Name	Tag	Required	Description
name	PROP_STR	yes	A string name for this node. (see virtual-device class table).
device-type	PROP_STR	yes	A string type for this node. (see virtual-device class table).
compatible	PROP_DATA	yes	An array of string names for this node. (see virtual-device class table).
cfg-handle	PROP_VAL	yes	A 64-bit unsigned integer identifying this device uniquely.
devalias	PROP_STR	no	A string name that indicates the devalias name that the should be assigned to the associated virtual-device node.

**Device class specific properties**

Name	Tag	Required	Description
vsw-phys-dev	PROP_DATA	no	An array of string names identifying the physical network devices available locally for use by a virtual switch device.
vsw-switch-mode	PROP_DATA	no	An array of string names identifying the order of the preferred switching mode(s) for this switch device. Current valid values are <i>switched</i> , <i>promiscuous</i> , and <i>routed</i> .
local-mac-address	PROP_VAL	no	A 64-bit unsigned integer in which the lower 48-bits holds the mac address assigned to a virtual network or switch device. The upper 16-bits must be zero.

Name	Tag	Required	Description
default-vlan-id	PROP_VAL	no	A 64-bit unsigned integer, where the lower 12-bits holds the vlan-id used to designate untagged ethernet frames sent or received by a virtual network or switch device. The upper 52-bits must be zero.
port-vlan-id	PROP_VAL	no	A 64-bit unsigned integer, where the lower 12-bits holds the implicit port vlan-id assigned to this virtual network or switch device. The upper 52-bits must be zero.
vlan-id	PROP_DATA	no	An array of 64-bit unsigned integers, where the lower 12-bits of each element holds the vlan-id(s) assigned to this virtual network or switch device. The upper 52-bits of each element must be zero.
priority-ether-types	PROP_DATA	no	An array of 64-bit integers where the lower 16-bits of each element holds a high priority ethernet type. The upper 48-bits of each element must be zero. The ethernet type corresponds to the <i>Type</i> field in the Ethernet frame as defined by the Ethernet v2 / DIX standard.  The virtual network and switch device should prioritize frames with these types over other frames, and ensure that these frames are not dropped, under congestion.
mtu	PROP_VAL	no	A 64 bit unsigned integer in which the lower 16 bits hold the size of maximum transmission unit (MTU) of a virtual network or a switch device. The upper 48 bits must be zero.
vcc-min-tcp-port	PROP_VAL	no	A 64-bit unsigned integer identifying the smallest TCP port assignable to a console group in a SUNW,sun4v-console-concentrator device.
vcc-max-tcp-port	PROP_VAL	no	A 64-bit unsigned integer identifying the largest TCP port assignable to a console group in a SUNW,sun4v-console-concentrator device.
vlds-domain-handle	PROP_VAL	no	A 64-bit unsigned integer that uniquely identifies the domain containing the SUNW,sun4v-domain-service device.

**virtual-device class table (non-channel devices)**

Service Group	Class	compatible	device-type	name
Console	Client	SUNW, sun4v-console	serial	console

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**virtual-device class table (channel devices)**

Service Group	Class	compatible	device-type	name
Network	Client	SUNW, sun4v-network	network	network
Network	Server	SUNW, sun4v-network-switch	vsw	virtual-network-switch
Block	Client	SUNW, sun4v-disk	block	disk
Block	Server	SUNW, sun4v-disk-server	vds	virtual-disk-server
Console	Server	SUNW, sun4v-console-concentrator	vcc	virtual-console-concentrator
Serial	Server	SUNW, sun4v-channel	serial	virtual-channel
Serial	Client	SUNW, sun4v-channel	serial	virtual-channel-client
Serial	Server	SUNW, sun4v-data-plane-channel	serial	virtual-data-plane-channel
Serial	Client	SUNW, sun4v-data-plane-channel	serial	virtual-data-plane-channel-client
Serial	Server	SUNW, sun4v-domain-service	serial	virtual-domain-service

**1.1.4 Virtual device port node**

Name	virtual-device-port
Category	optionally required by virtual-device node
Required subordinates	-
Optional subordinates	channel-endpoint

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**Description**

This node uniquely represents an instance of a virtual port device. All virtual-device channels connected to the same client are grouped under a single port device. Every virtual-device will have zero or more virtual-device-port nodes.

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**Common properties**

Name	Tag	Required	Description
name	PROP_STR	yes	A string name for the device. (See virtual-device-port class table)
id	PROP_VAL	yes	A 64-bit unsigned integer identifying this port uniquely within the virtual-device.

**Device class specific properties**

Name	Tag	Required	Description
vds-block-device	PROP_STR	no	A string name identifying the block device used by a port in a SUNW,sun4v-disk-server device .
vds-block-device-opts	PROP_DATA	no	An array of string names identifying the options for the device used by a vds-port in SUNW,sun4v-disk-server device. Current valid options are:  "ro" - The device is used and exported by vds as a read-only device  "slice" - The device is exported by vds as a disk slice.  "exclusive" - The device is opened for exclusive use by this vds instance only. The device cannot be used by another client or vds instance on the guest.  "shared" - The device is exported by the virtual disk server instance to one or more clients connected to it.
vds-block-device-name	PROP_STR	no	A string name identifying the canonical name assigned to the block device used by a port in SUNW,sun4v-disk-server device.
vds-mpgroup-name	PROP_STR	no	A string name identifying the multi-path group a port belongs to in a SUNW,sun4v-disk-server device.
vdc-timeout	PROP_VAL	no	A 64-bit integer identifying a block device's connection timeout. The value specified in seconds determines the period after which a SUNW,sun4v-disk device will timeout submitting requests if it cannot establish a connection with the virtual disk server. If the property is either not specified or set to 0, the block device will wait indefinitely to establish a connection with the virtual disk server.
vcc-tcp-port	PROP_VAL	no	A 64-bit unsigned integer identifying the TCP port assigned to a console group. Provided to vnts daemon via the vcc driver.
vcc-group-name	PROP_STR	no	A string name identifying the console group for a domain. Provided to the vnts daemon via the vcc driver.
vcc-domain-name	PROP_STR	no	A string name identifying a domain's console uniquely. Provided to the vnts daemon via the vcc driver.

Name	Tag	Required	Description
remote-mac-address	PROP_DATA	no	Array of 64-bit unsigned integers where the lower 48-bits of each element holds the mac address assigned to the virtual network or switch device. The upper 16-bits of each element must be zero.  This array is a list of mac addresses that are known to be accessible via this port. This is not a complete and comprehensive list.
remote-port-vlan-id	PROP_VAL	no	A 64-bit unsigned integer, where the lower 12-bits holds the implicit port vlan-id assigned to the peer virtual network or switch device. The upper 52-bits must be zero.
remote-vlan-id	PROP_DATA	no	An array of 64-bit unsigned integers, where the lower 12-bits of each element holds the vlan-id(s) assigned to the peer virtual network or switch device. The upper 52-bits of each element must be zero.
switch-port	PROP_VAL	no	Identifies this port as being associated with a SUNW,network-switch device. Property value must be zero. Other values are reserved.  <i>Programming note: When using a distributed switch model, this property assists a simple guest in finding a switch port rather than querying every port directly.</i>
vldc-svc-name	PROP_STR	no	A string name identifying the service a SUNW,sun4v-channel device is providing over this port.
vdpc-svc-name	PROP_STR	no	A string name specifying the service a SUNW,sun4v-da ta-plane-channel device is providing over this port
vlds-remote-domain-handle	PROP_VAL	no	A 64-bit unsigned integer that uniquely identifies the domain to which a vlds-port node is associated.

**virtual-device-port class table**

Service Group	Class	name	name of parent virtual-device node
Network	Client	vnet-port	network
Network	Server	vsw-port	virtual-network-switch
Block	Client	vdc-port	disk
Block	Server	vds-port	virtual-disk-server

Service Group	Class	name	name of parent virtual-device node
Console	Client	vcc-port	virtual-console-concentrator
Serial	Server	vldc-port	virtual-channel
Serial	Client	vldc-port	virtual-channel-client
Serial	Server	vdpc-port	virtual-data-plane-channel
Serial	Client	vdpc-port	virtual-data-plane-channel-client
Serial	Server	vlds-port	virtual-domain-service

### 1.1.5 Channel endpoints node

Name channel-endpoints  
 Category optionally required by root node  
 Required subordinates -  
 Optional subordinates channel-endpoint  
 Description

This node uniquely represents a collection of channel endpoint nodes being used by this guest. There should be only one channel-endpoints node. The single channel-endpoints node will have zero or more channel-endpoint nodes as subordinates.

### 1.1.6 Channel endpoint node

Name channel-endpoint  
 Category optionally required by channel-endpoints node  
 optionally required by virtual-device-port nodes  
 Required subordinates -  
 Optional subordinates -  
 Description

This node uniquely represents an instance of a channel endpoint available to this guest. Every virtual-device-port node will have zero or more channel-endpoint nodes.

#### Properties

Name	Tag	Required	Description
id	PROP_VAL	yes	A 64-bit unsigned integer identifying this endpoint uniquely within the guest.
tx-ino	PROP_VAL	yes	A 64-bit unsigned integer identifying the interrupt number assigned to the transmit interrupt for this endpoint.
rx-ino	PROP_VAL	yes	A 64-bit unsigned integer identifying the interrupt number assigned to the receive interrupt for this endpoint.