

A YANG model for Power Management

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Goal: Enable detailed power management for network elements

- Report on power consumption on a per-component basis
- Allow the management plane to put a component into power-save mode (if capable)
- Model functional dependencies between components (e.g., this line card requires that switch card)
- Allow the management plane to provide expected traffic to the system for internal power optimization
 - 10% traffic load requires only 10% of the switch fabric

Power Consumption

- Augments component from draft-y3bp-ivy-network-inventory-yang

Name: used-power

Node Type: leaf

Data Type: uint32

- Power drawn by the component, in watts. This is consistent with OpenConfig. This may be dynamically measured or a static value.

Power Save

Name: power-save

Node Type: leaf

Data Type: Boolean

Access: Read/write

Default: false

- True if the component is in power-save mode. Writeable by the management plane.

Power Save Capability

Name: power-save-capable

Node Type: leaf

Data Type: Boolean

- True if the component can be put in power-save mode

Automatic power management

Name: automatic-power-management

Node Type: leaf

Data Type: Boolean

Access: Read/write

Default: True

- Some components (e.g., switch fabrics) can perform automatic power management. This provides a manual override to disable the automatic operation.

Functional Dependencies

Name: required-components

Node Type: List

Name: dependent-components

Node Type: List

- The current component hierarchy captures physical relationships but doesn't capture functional relationships. For example, a line card requires a set of switch cards. Each switch card has a set of dependent line cards. These relationships can be dynamic.

Tree Representation

+--rw component* [component-id]

+--rw component-id string

+--ro used-power? uint32

+--ro power-save-capable? boolean

+--rw power-save? boolean

+--ro required-components* -> ../../component/component-id

+--ro dependent-components* -> ../../component/component-id

Traffic Planning

- Augment RFC 8343 interfaces with expected traffic levels. This allows systems to optimize internal power consumption. The management plane provides expected input/output bandwidths in bits per second. A value of zero (0) indicates full bandwidth.

Name: expected-input-bandwidth

Node Type: leaf

Data Type: yang:gauge64

Default: 0

Access: Read/write

Name: expected-output-bandwidth

Node Type: leaf

Data Type: yang:gauge64

Default: 0

Access: Read/write