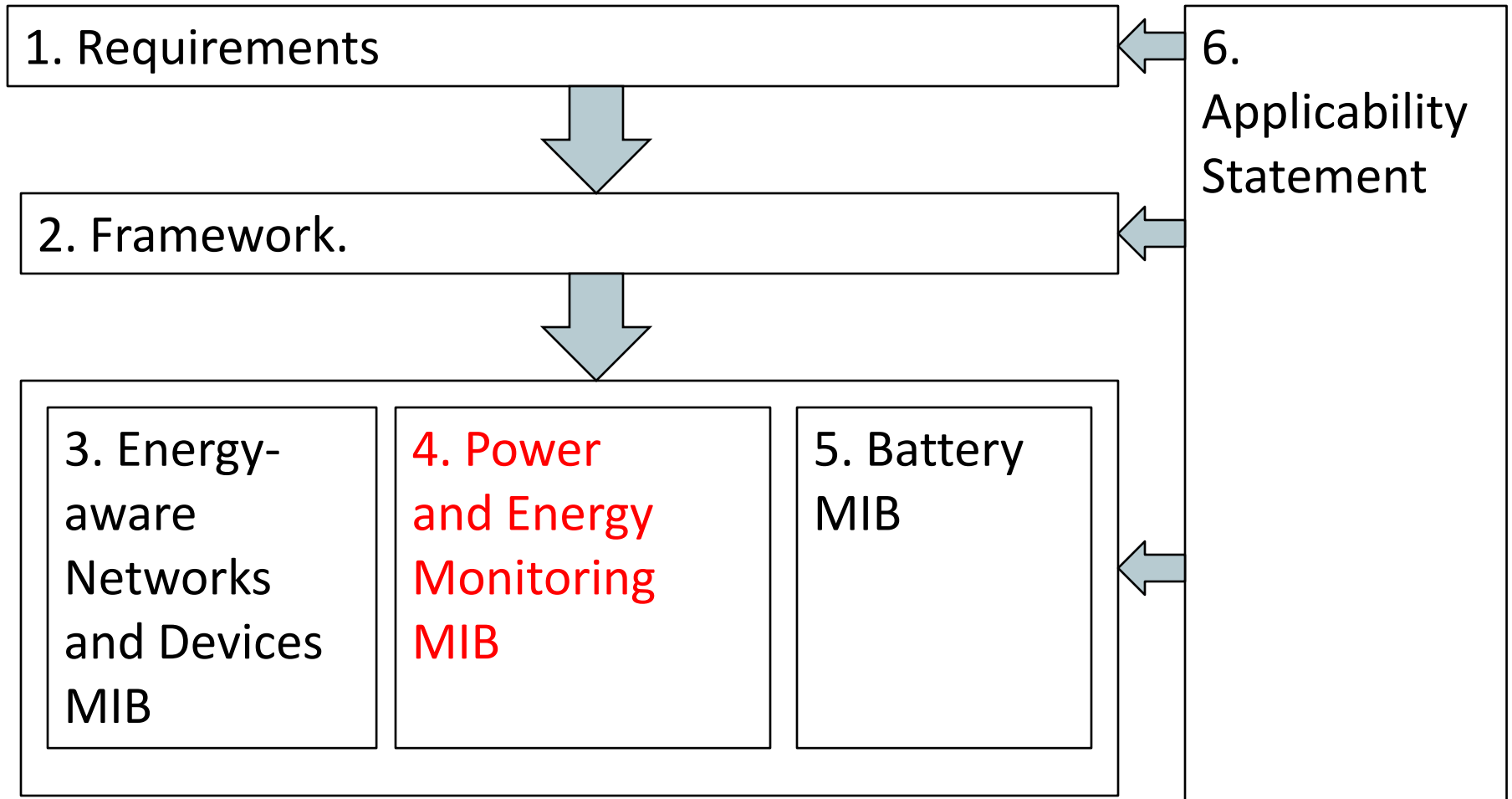# Power and Energy Monitoring MIB

draft-claise-energy-monitoring-mib-06
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EMAN Charter: Documents

1. Requirements	6. Applicability Statement
2. Framework.	
3. Energy-aware Networks and Devices MIB	4. Power and Energy Monitoring MIB	5. Battery MIB	

Power and Energy Monitoring MIB
Area of Focus

- Power measurement
  - attributes of the power measurement
- Power Levels (as defined in the framework)
- Demand Energy measurement
- Power Quality

- Important point: based on the pmIndex defined in the energy-aware MIB

Power and Energy Monitoring MIB
What is new

- Has been discussed @ prior meetings in IETF OPSAWG

- What is new in Version – 06 ?
  - MIB modules divided according to the EMAN WG Charter
  - Incorporated feedback from the mailing list
  - Prototype implementation of MIB

Power and Energy Monitoring MIB
Power measurement and attributes of the measurement

- pmpower – Integer 32 – (R) – actual measurement
- pmNameplatepower – Integer 32 – (R) – max/worst case power
- pmPowerUnitMultiplier – UnitMultiplier – (R) – Scale / Exponent
- pmPowerAccuracy – Integer32 – (R) – percentage of accuracy
- pmPowerMeasurementCaliber - INTEGER – (R) – measurement method
- pmCurrentType – INTEGER – (R) – AC or DC
- pmPowerOrigin – INTEGER – (R) – power source (self /remote)

Power and Energy Monitoring MIB

- Power Level
  - pmPowerLevel – PowerMonitorLevel – (RW) – one of the power (0,1, …12) power levels
  - pmPowerActualLevel - PowerMonitorLevel – (R)
  - pmManufacturerActualPowerLevel –Integer32 – (R)
  - pmManufacturerMappingId - Integer32 - – (R) – Manufacturer ID

- PowerLevelTable
  - pmPowerLevelIndex - PowerMonitorLevel – (R) – index
  - pmPowerLevelMaxPower - Integer32 – (R) – max power
  - pmPowerLevelPowerUnitMultiplier – UnitMultiplier – (R) – units

Concept of Manufacturer Defined Power Levels

```
Manuf Defined Power Level        Manf Defined Name
              0                         none
              1                         short
              2                         tall
              3                         grande
              4                         venti
```

Implementation:
Device
Manufacturer's
Capability

STD Power Level/Name   User Power Level / Name

STD Power Level/Name	User Power Level / Name
1 / Mech Off	0 / none
2 / Soft Off	0 / none
3 / Hibernate	0 / none
4 / Sleep, Save-to-RAM	0 / none
5 / Standby	0 / none
6 / Ready	1 / short
7 / LowMinus	1 / short
8 / Low	1 / short
9 / MediumMinus	2 / tall
10 / Medium	2 / tall
11 / HighMinus	3 / grande
12 / High	4 / venti

Interface:
Mapped to
the
Standard
Levels

pmPowerLevelMappingTable

Mapping Id	Power level	Manu Level
9	1	0
9	2	0
9	3	1
9	11	1

Mapping Table 1

pmIndex	MappingId
2001	9
2002	5
2003	9
2004	2

pmTable

Mapping Id	Power level	Manu Level
5	1	1
5	3	2
5	6	3

Mapping Table 2

Mapping Id	Power level	Manu Level
2	1	1
2	10	2

Mapping Table 3

Mapping Table for CISCO Switch : mappingId = 9(say)
Cisco Switch: 2 levels (0/1 i.e On/Off)

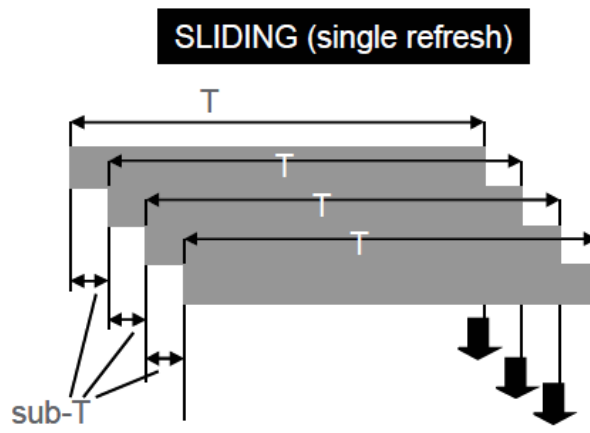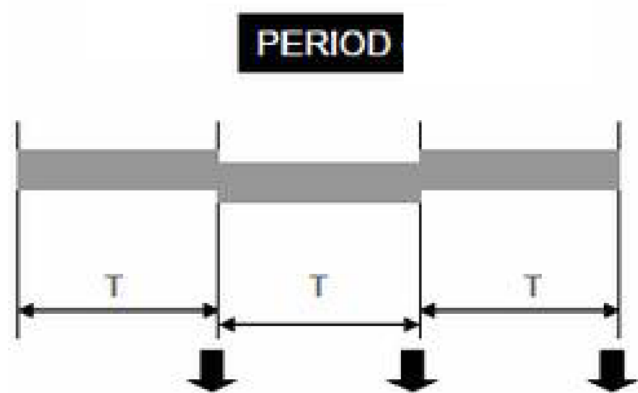| Map Id	pmPowerActualLevel	pmManu DefinedLevel	pmManu Name	Max Usage	Units
9	1 (Mech Off)	0	On	100	0
9	2 (Soft-off)	0	On	14000	-3
9	3 (Hibernate)	1	Off	14000	-3
9	4 (Sleep)	1	Off	14000	-3
9	5 (Standby)	1	Off	14000	-3
9	6 (Ready)	1	Off	14000	-3
9	7 (LowMinus)	1	Off	14000	-3
9	8 (Low)	1	Off	14000	-3
9	9 (MediumMinus)	1	Off	14000	-3
9	10 (Medium)	1	Off	14000	-3
9	11 (HighMinus)	1	Off	14000	-3
9	12 (High)	1	Off	14000	-3

Power and Energy Monitoring MIB PowerLevelMappingTable

- pmManufacturerDefinedPowerLevel – Integer32 – (R) – Power levels of the device

- pmManufacturerPowerLevelMaxPower – Integer32 – (R) – Max power at that level

- pmManufacturerPowerLevelPowerUnitMultiplier – UnitMultiplier – (R) – Units

- pmManufacturerPowerLevelName – DisplayString – (R) – Name

Power and Energy Monitoring MIB Demand Measurement

- Optional - IEC 61850 reference model ,
- added a new mode of measurement collection (total)

Power and Energy Monitoring MIB EnergyDemand Table - Parameters

- pmDemandEnergyParametersIntervalLength – TimeInterval – (R) – window of measurement - 15 minutes

- pmDemandEnergyParametersIntervalNumber – Integer32 – (R) – Index

- pmDemandEnergyParametersIntervalMode – Integer32 – (R) – periodic or sliding window or total

- pmDemandEnergyParametersIntervalWindow – TimeInterval – (R) – Offset

- pmDemandEnergyParametersSampleRate – Integer32 – (R) – sampling rate in milli-seconds

- pmDemandEnergyParametersStatus – RowStatus – (R) – Power levels of the device

Power and Energy Monitoring MIB EnergyDemand Table – Data

- pmDemandEnergyIntervalStartTime - TimeTicks – (R)

- pmDemandEnergyIntervalEnergyUsed - Integer32 – (R)

- pmDemandEnergyIntervalEnergyUnitMultiplier - UnitMultiplier, – (R)

- pmDemandEnergyIntervalMax - Integer32 – (R)

Power and Energy Monitoring MIB PwrQualityTable

- optional; based on IEC 61850; applies only AC
  - pmACPwrQualityConfiguration - INTEGER – (R) – DEL or WYE
  - pmACPwrQualityAvgVoltage - Integer32
  - pmACPwrQualityAvgCurrent - Integer32
  - pmACPwrQualityFrequency - Integer32 – (R) – freq of AC
  - pmACPwrQualityPowerUnitMultiplier – UnitMultiplier
  - pmACPwrQualityPowerAccuracy - Integer32
  - pmACPwrQualityTotalActivePower - Integer32
  - pmACPwrQualityTotalReactivePower - Integer32
  - pmACPwrQualityTotalApparentPower - Integer32
  - pmACPwrQualityTotalPowerFactor - Integer32
  - pmACPwrQualityThdAmpheres - Integer32
  - pmACPwrQualityThdVoltage - Integer32

Power and Energy Monitoring MIB PwrQualityPhase

- measurement for each phase – based on IEC 61850
  - pmPhaseIndex - Integer32
  - pmACPwrQualityPhaseAvgCurrent - Integer32
  - pmACPwrQualityPhaseActivePower - Integer32
  - pmACPwrQualityPhaseReactivePower - Integer32
  - pmACPwrQualityPhaseApparentPower - Integer32
  - pmACPwrQualityPhasePowerFactor - Integer32
  - pmACPwrQualityPhaseImpedance - Integer32

Power and Energy Monitoring MIB Conclusions

▶ This draft has been presented before @ IETF

▶ Prototype implementation of the MIB

▶ Dependencies on the requirements, framework (concepts), energy-aware MIB module (index)
  ▶ based on the pmIndex defined in the energy-aware MIB

▶ Power and Energy Monitoring MIB adopted as a Working Group item?

▶ Comments , Feedback