

Imaging System Power Management

**Notes from the
Printer Working Group
February Face-to-Face Meeting**

Introduction



- A “Birds of a Feather” meeting concerning the establishment of a project defining elements for the management/monitoring of Imaging System Power states was held at the February 2009 Printer Working Group Face-to-face.
- These notes reflect what was discussed, and the sense of the group, although no final conclusions were arrived at.

Introduction



- However, it was decided that, prior to initiating this project of type, it must be ascertained that there was sufficient support in the PWG membership to:
 - Provide the resources to develop a meaningful and effective standard
 - Ensure meaningful review and prototyping of such a standard
 - Anticipate adoption and implementation of the standard by a significant portion of the industry
- These notes are intended to:
 - Provide initial information of the intent of the project
 - Identify types of additional information needed to properly define the project
 - Solicit indications of interest and support (or alternative ideas) from the PWG membership.

Background



- Requirement for effective use of electrical power
 - Economic and Environmental Issues
 - Purchaser Requirements
 - Government and Organizational Standards
- OS Vendors (e.g., Microsoft) making “Green” push
 - Power Monitoring and Management Provisions
 - Effect Host System and Associated Devices
- Imaging Devices are prime candidates
 - Require “instant” availability but have intermittent use
 - Can have extended periods of non use
 - Many devices use technology requiring significant power
- Industry Standard Power Management Elements
 - Benefits manufacturers, applications and users

Issues – Membership Support



- Consideration of Power Management Issue
 - Is it something to be addressed?
 - Is it desirable to your company to have Industry Standard Management Elements?
 - Will your company support the development of Standard?
 - What are your company's determining requirement factors?
 - What motivations would drive a company to support the development of a standard. What kind of external pressures would/do exist to encourage such adoption?
 - What are the unique characteristics of an imaging device that would justify a PWG-specific activity rather than adoption of some existing scheme or the definition by a different group?

Issues – Project Definition



- Objectives
- Requirements
 - External Factors determining Requirements
 - Device-specific factors
- Scope
 - What devices? Or Services?
 - Monitoring or Management?
 - Modes of operation? Power states?
 - Definition of elements and what bindings? (MIBS, CIM, WS Man)
 - Remote and Local interface?
- First cut on Project Steps and Schedule Objectives

Factors Determining Requirements



- **Government Standards**
 - EU Directive, Energy Star, others? (US States' standards governing purchases)
 - There are specific requirements relative to hardcopy imaging equipment monitoring/management.
 - Some specific maximum power consumption values based on class of device.
 - Some dictate internal power management policy
 - Some are just general power conservation objectives
 - Task to collect and summarize government standards
- **Compatibility with OS System Features**
 - Microsoft, others?
 - What are the requirements?
 - Task to collect and summarize OS's requirements

Factors Determining Requirements



- Compatibility with other Standards
 - CIM
 - Advanced Configuration and Power Interface (ACPI)
 - IEEE 1621-2004
 - **ECMA**
 - Others?
 - Task to collect and summarize Power Management requirements in applicable, recognized standards
- Customer Requirements
 - Government and Private RFQ and purchase requirements
 - Are customers interested?
 - What are they demanding?

Imaging System Specific Factors



- Compatibility with existing practices
 - All manufacturers current implement some degree of power management
 - These represent implementable and somewhat effective approaches
 - Consider and summarize existing practices, along with perception as to effectiveness
- Device-Specific Characteristics
 - Printer Fusing
 - Scanner Lamp stabilization
 - Network and Fax monitoring line activity
 - What other special imaging system characteristics?
- What is Effective, Appropriate and Feasible?

Imaging System Specific Factors



- How many power states and how to name them?
(e.g., Active, Idle, Standby, Sleep, Hibernate, Off)
 - May be determined by external factors
- Security
 - Must be well considered.
 - How to present Power Management from being vehicle for DOS attack?
 - Rely upon binding/transport or disallow setting.
- Bindings/Transports for defined elements. Possible bindings.
 - SNMP, CIM, other Web Services, Local Console, IPP?
 - At least one binding must be defined and prototyped to validate the elements specification

Scope Issues



- For MFDs or just printers?
 - Both Single and Multi Function Hardcopy Imaging Devices
 - Requirements and factors may be very different for different types of device
- Address all classes of equipment from SOHO to Production?
 - Need to consider further. Many production-class imaging devices may be addresses by existing computer schemes
 - Need identification of production-level devices
 - May have consistent set of elements but differences in what is mandatory
 - May deal with different classes in multi-phased approach

Scope Issues



- Management of a Unit, Device or Subunit Basis?
 - Different Subunits have different characteristics
 - Need Entire Unit “rollup”, but perhaps also some subunit-specific elements
- Limit scope to Management elements for access?
 - Also define Power states, local user interaction?
 - Objective to define consistent semantics independent of specific bindings (but compatible with likely bindings). Local user interface may be one way to access these elements.
- Monitoring or Management?
 - Report state but also provide set to state?
 - Provide for setting of policy determining state?
 - Provide for setting power state according to ToD clock?
 - Tentative response: reporting may be mandatory. Setting to be defined but optional, depending on other requirements

Scope Issues



- Deal with power consumption objectives?
 - Just deal with power states and transition between states.
 - Absolute maximum power consumption allowed determined by others.
 - But some mapping is necessary between specified states and states defined in other requirements.
- Are reported power states reflecting
 - actual power consumption (levels or relative levels)?
 - Operational Mode (e.g., idle, standby, sleep, etc.)?
 - Latency (times to come to full operation)?
 - Other?
 - Consensus was that power states reflect Operational mode, but that some mapping to relative power consumption levels and/or response latency may be included

Scope Issues



- Consider sets of elements for different environments?
 - Make distinction between usage environments
- Certification Capability?
 - Consensus that certification is beyond scope although a self certification procedure might be very useful.
- ACPI V4.0 is under development. Do we want to participate?
 - Consensus that this may be very desirable but unclear that resources exist to do this.
 - Observation that, from the ACPI membership requirements, PWG as a body could not join.
 - Perhaps PWG member company that participated in ACPI could represent Power Management Projects interests.

Other Issues



- Power Management may have implications beyond remote reporting or setting of Power State or Policy.
 - Independent power control of subunits
 - Local user power control
 - Logical Design of the System
 - Physical partitioning of the Unit

Project Statement



- **Statement of Problem**
- **Objectives**
- **Out-of-scope**
- **Project Phases & Timeframes**
 - General Requirements
 - e.g., compliance with certain standards and directives
 - Specific Requirements
 - e.g., definition of states, monitoring, setting of states, policies,
 - Specification of Elements and Actions
 - Representative Binding
 - Prototype

References & Resources



- http://ec.europa.eu/enterprise/eco_design/directive_2005_32.pdf
 - EU General directive on “ecodesign” requirements and enforcement – nothing specific on power management
- <http://www.euractiv.com/en/energy-efficiency/eco-design-requirements-energy-products-eup/article-117467>
- http://europa.eu/lex/lex/LexUriServ/site/en/oj/2005/l_191/l_19120050722en00290058.pdf
- <http://www.itu.int/ITU-T/studygroups/com15/sg15-q14.html>
- http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?tp=&isnumber=31207&arnumber=1453037&punumber=9863 (IEEE 1621-2004 " IEEE Standard for User Interface Elements in Power Control of Electronic Devices Employed in Office/Consumer Environments")
- http://www.dmtf.org/standards/cim/cim_schema_v220/
- http://en.wikipedia.org/wiki/Advanced_Configuration_and_Power_Interface#Power_States

References & Resources



- <http://www.greensupplyline.com/showArticle.jhtml?articleID=197008841>
 - Article summarizing EU and US Energy Star provisions
- <http://www.leonardo-energy.org/drupal/tracker>
 - Tracking of energy related articles and posts
- http://www.bureauveritas.com/wps/wcm/connect/bv_com/group/home/about-us/our-business/our-business-consumer-products/regulatory_bulletins/eup_standby_offmode_household_office+equipment/?presentationtemplate=bv_master/CPS_full_story_presentation
 - Summary of Requirements and Timescales for Information technology equipment intended primarily for domestic use. Can sign up for bulletins.
- http://www.newark.com/jsp/ bespoke/base.jsp?bespokepage=newark/en_US/edworld/legislation-center/EuP/eup-scope.jsp
- <http://www.acpi.info/> (ACPI V4.0 is under development.)