Simple Event Notification Service Environment

Brief Project Overview

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Topics

- Requirements and Goals
- Constraints and Non-Goals
- Benefits and Risks
- Concepts
- Protocol Details
- Issues
- Plan
- Development Schedule
- Questions & Answers

SENSE Requirements

- Reasonably reliable receipt of Events
- Dynamic registration for receipt of Events from multiple sources
- Support for virtually any kind of Event data
- Implementable within embedded systems
- Server-oriented resource management
- High degree of scaleability
- Modest directory services
- Simple query capabilities
- Service accessed by both fixed and configurable addresses
- Easily implemented on all major platforms

SENSE Goals

- Achieve “80% coverage” for basic monitoring requirements by average users
- Provide a certain degree of extensibility
- Promote a component architecture based on public standard specifications
- Rapidly achieve critical mass in the marketplace
- Integration with existing management products
- Maximum integration of legacy products
- Provide vendors with a wide range of opportunities for value-added components
- Promote a simple form for the expression of overall operational state
- Allow non-priviledged users to operate a SENSE Server

SENSE Constraints

- Must use datagrams as the primary transport
- Must not become overly complicated
- Must not be immediately tied to future efforts by other organizations
- Client API libraries are a necessity
- Minimum “neutral” Event Protocol required to quickly produce products

SENSE Non-Goals

- Assumption of IETF-sponsored standards effort
- No required security framework
- Not a replacement for SNMP
- Platform bundling not required for success

SENSE Benefits

- Significantly decreased time for fault identification
- Unparalleled “plug ‘n play” for printing system vendors
- User perception of significantly increased cooperative integration by the printer industry
- Leverages both proprietary and standards efforts conducted to date
- Able to “raise the bar” of product features at very low development costs
- Strong opportunity for user customization
- Low cost
- High availability
- Potential for the creation of an entirely new kind of network management systems market

SENSE Risks

- Pressure to wait for competing efforts to complete
- Pressure by SNMP-related groups to divert efforts to exclusively SNMP-oriented solutions
- Failure to achieve widespread support within the printing systems industry

SENSE Concepts

- Server
- Client
- Subscriber
- Publisher
- Manager
- Transient
- Registration
- Publication
- Edition
- Subscription
- Query
- Event Message

SENSE Concepts: Server

- Services requests from all types of Clients
- Manages registered Client sessions
- Responds to queries
- Transmits Event Messages
- Publishes its own set of Events

SENSE Concepts: Client

- One of four different types of service consumers
  - » Subscriber
  - » Publisher
  - » Manager
  - » Transient
- Must register for any services beyond queries

SENSE Concepts: Subscriber

- One type of SENSE Client
- Primary interest is to receive Events from one or more event sources
- Registers to receive Events over a defined period of time
- Must periodically renew registration
- Subscribes for Events on a per-source basis
- Able to direct Events to arbitrary transport address

SENSE Concepts: Publisher

- One type of SENSE Client
- Primary interest is to submit Events to the Server
- Must register with Server to effect services
- Can register multiple event sources
- Can register multiple forms for a single event source
- Registers a set of properties, both standard and optional

SENSE Concepts: Manager

- One type of SENSE Client
- Able to perform certain minimal management operations on Server
- Must register with Server
- Not currently well defined

SENSE Concepts: Transient

- One type of SENSE Client
- Primary interest is to receive responses to queries submitted to Server
- Typically becomes a Subscriber or Publisher after processing query responses
- No registration is required

SENSE Concepts: Registration

- Procedure to establish a session on the Server
- Required of Subscribers, Publishers and Managers
- Session length set to a finite period
- Client “suggests” the registration period
- Server “declares” the registration period
- Client submits identifying Properties with registration request, both standard and optional

SENSE Concepts: Publication

- Name given to a specific event source
- Registered by a Publisher
- Contains identifying Properties, both standard and optional
- Clients can query a Publication's properties
- Publisher can update the Properties at any time
- Subscribers perceive the set of registered Publications as the domain of available event sources

SENSE Concepts: Edition

- A kind of Publication “subclass”
- Used to provide different forms of the same Publication based on various dimensions:
  - » Form (syntax)
  - » Content
  - » Periodicity
- Publishers register Editions when registering Publications, including a Default Edition
- Clients may query available Editions and obtain their identifying properties
- Edition may be comprised of arbitrary binding of dimensions
- Examples
  - » Lexmark Optra
  - » HP LaserJet/JetDirect

SENSE Concepts: Subscription

- A registered interest in a particular Publication
- The binding between Subscriber and Publication
- Events continue to be sent to the Subscriber until the Subscriber's registration period expires
- Server returns a unique Subscription Id
  - » Used as a "subsession handle" by the Subscriber
  - » Provides lightweight identification of source of Event Messages

SENSE Concepts: Query

- **Clients can submit requests for information from the Server**
  - » **List Publication Names**
  - » **List Publication Properties**
  - » **List Publisher Names**
  - » **List Publisher Properties**
  - » **List Server Properties**
- **Server responses are transmitted only once**
- **Client does not have to be registered to submit queries and receive responses**

SENSE Concepts: Event Message

- A “bundle” of time-oriented information from a single Publication
  - » Indentifying Properties, both standard and optional
    - – Subscription Id
    - – Timestamp
  - » Optional block of Publication-specific event data
    - – Format defined by the Publisher
    - – Subscriber must be able to parse the data to derive semantics
- Server does not manipulate Event data in any way
- Server may add additional Properties to the Message
- Server retransmits Event Message to Subscriber until:
  - » Subscriber acknowledges receipt
  - » Maximum retries reached
  - » Maximum message life reached (TTL)

SENSE Protocol Details

- Protocol is dubbed “CommonSENSE”
- Derived from Digital’s Common Printer Access Protocol (CPAP) specification
- Primarily revolves around sets of named strings called “Properties”
- Does not suffer from “Endian” problems
- Easily generated, easily parsed
- Has significant potential for extensibility
- Can easily be used as a SENSE Event Protocol
- CPAP form in use for nearly 10 years now

SENSE Potential Issues

- Is this something the Printer Working Group can get behind and sponsor?
- How closely must this work track the X/Open "SysMan" Event Management Service (EMS) effort?
- Performance goals and expectations
- Basic, common Event Protocol needed at the start
- Name space administration
- Even if the Printer Working Group sponsors and endorses SENSE, will it "fall by the wayside"?...

SENSE: The Plan

- Quickly determine whether the Printer Working Group is willing to sponsor this effort in an independent manner
- Transition from ad hoc group to more formal working subgroup
- Develop complete specifications
  - » Architectural Model
  - » Protocol(s)
- Produce a minimally complete implementation for experimentation purposes
  - » Underscore would prefer to lead this effort
- Release a freely distributable SENSE package for public use

SENSE: Development Schedule

Feb ‘96 -- Draft Architectural Model and Protocol Specs

Mar ‘96 -- PWG vote on sponsorship

Apr ‘96 -- Finalize Model and Protocol Specs

May ‘96 -- First complete working prototype

Jun ‘96 -- First public SENSE release

Questions & Answers

Rules:

- No flaming the speaker without justifiable cause
- No detailed questions on name space issues
- No attempts propose a solution to World Hunger or World Peace
- No, I have not yet had contact with X/Open
- Must not discuss beyond the alloted time without paying tribute to the chairperson