Ateneo de Manila University

IP-based Software for Sensory Control and Data Acquisition

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Section I

Introduction
"A good product is the perfect balance between hardware and software."
Hardware vs. Software

Factors affecting decisions regarding hardware and software implementations:

- Speed/Performance
- Flexibility
- Cost

Getting the right mix can mean significant performance and cost trade-offs.

- Transmeta Crusoe
- Software vs. Hardware RAID
Section II

SCADA-TEMS
SCADA-TEMS Goals

★ Control
★ Expandability
★ Universal Access
SCADA-TEMS

★ Sensory Control and Data Acquisition - Total Environmental Management System

★ system that enables expandable control and accessibility for multiple remote devices

★ flexible interfacing architecture for multiple control systems
SCADA-TEMS

★ Applications include power plants, factories, relay facilities and other physically dispersed systems
★ mission critical systems that entail just-in-time reporting and response
★ flexible interfacing for centralized or distributed control systems
SCADA-TEMS Benefits

★ Remote Control
  – control multiple devices
  – provide flexible interface

★ Virtual Coverage
  – provide multiple access mechanisms
  – offer diverse warning options
Section III

SCADA-TEMS Software
Software Components

Main Features:

★ Dynamically Loadable Modules
★ Network Daemon Implementing SACP
★ User Authentication

Supplementary Modules:

★ ECP Control Library
★ MPEG2-Layer3 Decoder, Audio Mixer and Playback Library
Dynamically Loadable Modules

★ ability to add control and acquisition features without having to re-compile the entire package

★ software modules can also serve as test modules while hardware interfaces are not available

★ each module has two main methods that are implemented:
  – system control method
  – status retrieval method
Network Daemon Implementing SACP

★ implements the SACP protocol

★ adds a large number of possible interfaces clients:
  – Web-based/PHP Interface
  – Raw Socket Connection
  – Terminal Emulation
  – Java Client

★ provides the proper system checks for invalid commands and improper invocation
User Authentication

★ adds a layer of security for accessing the SCADA-TEMS system

★ basic security infrastructure for SCADA-TEMS modules

★ must be complemented with other technologies:
  – TLS/SSL - for web-based access security
  – Host-based Firewalls (iptables/ipchains)
SACP

- Simple Access and Control Protocol
- is an IP-based protocol that is similar to an FTP server’s responses
- has the following reply codes:
  - 1xx for in progress
  - 2xx for success
  - 3xx for more information needed
  - 4xx for temporary failure
  - 5xx for permanent or critical failure
SACP Sample Session

S: 100 SCADAD v1.0\r\nE: user <login>\r\nS: 300 Enter Password\r\nE: pass <password>\r\nS: 500 Authenticated.\r\nE: quit\r\nS: 200 Bye.\r\n
SACP Commands

⋆ set <device> <status> <level>

⋆ show <device>

⋆ start <device>

⋆ stop <device>

⋆ help
Exist SACP Clients

- Java SACP Client
- Web-based PHP SACP Client
- SMS-SACP Gateway
Section IV

Conclusion
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