Architecture for Control Networks

Presentation Material
developed by
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where does it come from?

- An open standard created by a process similar to AES Standards
- Developed by ESTA (Entertainment Services and Technology Association) a trade association of entertainment technology manufacturers, distributors and users
- Direct experience of the commercial benefits of open interconnectivity standards was crucial in creating support for ACN development
Scalability up to thousands of nodes – the same device that works in a small school one day may be connected in a large theme park the next.

Many networks are short lived and/or subject to frequent reconfiguration – elaborate manual setup is not feasible.

Reliable real-time performance optimized for live shows.

Multiple controllers, multiple devices and multiple uses.

A mainstream technology to benefit from the explosion of networking technologies and low cost equipment.

Avoid re-invention and use existing technologies wherever available.

Co-exist with other protocols on the same wire.
ACN is a modular architecture operating on UDP (part of TCP/IP)
It defines:

- A system discovery mechanism
- A multicast transport protocol for ordered and reliable message delivery
- A device control protocol for reading/writing properties in a device
- A device description language to specify the meaning of those properties
- Various small “glue” specifications (Interoperability Profiles – EPIs) to fit it all together
layering

Application

DDL

UDP

SLP

DMP

SDT
**service location protocol** Discovery

- SLP is an internet standard (RFC2608)
- Option to use Directory Agents makes SLP scale better than competing methods
- ACN specifies an SLP template for components which use its protocols
- Discovery via SLP allows automated bootstrap of entire systems
- Use of scoping and service attributes permit sophisticated browsing of network components by different criteria
Multicast transport allows management of groups of nodes in sessions, with co-ordinated delivery across all, or just specific devices.

Online status of remote nodes – latency vs traffic tradeoffs can be tuned to suit network context.

Individual messages may be sent reliably or unreliably.

Reliability parameters may be tuned for each session to suit conditions and requirements.
Device Management Protocol (DMP)

- Represents device state as a set of property values.
- Provides addressing mechanism and messages to access those properties (get-property, set-property, event).
- Event subscription mechanism with adjustable frequency and granularity is ideal for remote metering and display of other dynamic properties.
- Properties are generic – DMP does not specify their meaning, types or size.
An XML based language suited to structured data and off-the-shelf tools

- Description can be retrieved from the device itself, or obtained off-line
- Provides an abstracted control model of each type of device
- Descriptions can be dynamic and represent on-the-fly configurable devices like DSPs
- For each network accessible value in the model, the datatype, size, network address, access permissions etc. are specified
- Provides a comprehensive and extensible set of behaviors to represent the meaning and function of properties
- DDL is not specific to DMP and has been adapted to other protocols
Open source implementation of main ACN protocols
Trouble free BSD Licence
Has been built for multiple stacks and operating systems
Hosted at sourceforge.net
http://www.estaa.org/tsp/

http://www.engarts.com/acn/

http://www.sourceforge.net/projects/openacn

ANSI E1.17-2006 is available from ESTA or from ANSI

Dr Philip Nye will be at Audio Control Networks Workshop, 128th AES Convention, London, Saturday 22nd May, 2-4pm