DSA / White Space
Interoperability Work Group

Status Report for FCC 2nd Workshop
Wednesday, April 20, 2011
About the White Space Work Group

Officers
- Chair: Jesse Caulfield (Key Bridge Global LLC)
- Vice-chair: Dave Gurvey (Motorola Solutions)

Two Group Deliverables
- Database Operating Guidelines Document
- Device Interoperability Specification Document

Two Phases of Development
- Phase I Draft to inform FCC March 10 meeting (complete)
- Phase II Version 1.0 for publication

Collaborations with Industry and Other Groups
- Test and Measurement Group
- Regulatory Committee
- Security Group
- TD-LTE Group
- IEEE 802.22 and IEEE 802.19
- IETF and others expected upon deliverable completion
Group Structure and Approach

Open Participation
• The Group is open to all interested parties (members and non-members alike) – basically a free trial of WINForum services

Voting and Decision Making
• By charter: only WINForum members may officially vote
• However most all decisions are the result of open debate and straw poles

Contributions
• Group deliverables are developed and build upon each participant’s respective contributions, input, advice and guidance

Outreach and Participant Education
• Group has invited industry experts to brief participants on their experiences and observations with key technologies
  • Security Infrastructure by Fortinet Inc.
  • Status of FCC Spectrum Auctions by Bingham McCutchin
  • Internet Infrastructure by Equinix Inc.
  • Database Synchronization and Security by Oracle Corporation
The Group has an open invitation policy – all are welcome to participate.
1: Database Operating Guidelines

Concept of Operation
- Publish / Subscribe
- Party Responsibilities
- Use-case scenarios and Operational procedures

Communications
- Database to Database
- Database to FCC
- Entity registration procedures

Information Assurance
- Ecosystem security
- Data protection (identity and encryption)
- Use-case scenarios and Operational procedures

Other
- Synchronization frequency
- Transaction logging
- Records retention
2: Device Interoperability Specification

- **Concept of Operation**
  - Operating Modes
  - Party Responsibilities
  - Use-case scenarios and Operational procedures

- **Communications**
  - Device initialization
  - Device-to-database transactions
  - Internationalization

- **Information Assurance**
  - Identity management (authentication, authorization)
  - Data protection (encryption)
  - Use-case scenarios and Operational procedures

- **Other**
  - Enumerated and defined data fields
  - Reference implementation
  - Test and verification plan

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Interoperability Concept of Operations

- Devices may communicate with databases via any number of messaging specifications.
- Databases and devices may implement one or more specification as their needs require.
- WINNForum will define and specify a transaction specification that may be implemented according to several encoding and framing schemes.
- The WINNForum specification will:
  - Establish a baseline for interoperability through standardized message encapsulation, data encoding, security profile, identity management, etc.
  - Support extensibility to accommodate future requirements and proprietary features.
  - Build upon open standards.

![Diagram showing the concept of interoperability between databases and devices through standardized transactions and interfaces.](image)
Building a Standard White Space Message

1. Identify Required Transactions
2. Communications Protocol
3. Message Architecture
4. Required Data Fields
5. Data Encoding Scheme
## Transaction Strategy Selection

<table>
<thead>
<tr>
<th>Connection-oriented</th>
<th>Message-oriented</th>
</tr>
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<tbody>
<tr>
<td>Synchronous, session based communication – client establishes and maintains a connection with server.</td>
<td>Asynchronous, message based communication – client does not maintain session with server.</td>
</tr>
<tr>
<td><strong>DSA Work Group deliverables will address connection-oriented communication.</strong></td>
<td>Message-oriented communication may be addressed after completion of connection-oriented standards as time and group interest allow.</td>
</tr>
</tbody>
</table>
Defined Message Transactions

- **Device Registration**
  - ✓ Request
  - ✓ Response

- **Device Verification**
  - ✓ Request
  - ✓ Response

- **Available Frequencies**
  - ✓ Request
  - ✓ Response
## Consensus Communications Protocol

<table>
<thead>
<tr>
<th>OSI</th>
<th>Layer</th>
<th>White Space Messaging Protocol</th>
<th>Notes</th>
</tr>
</thead>
</table>
| 3   | Network   | Database must support IPv4 and IPv6  
Device must support IPv4, optional IPv6  | IPV4 and IPv6 support mandatory on databases; IPv6 optional on devices |
|     |           | Optional IPSEC                  | Optional IPSEC                                       |
| 4   | Transport | TCP/IP for transactions         |                                                     |
| 5   | Session   | Not specified (handled by TCP)  | TCP sockets                                          |
| 6   | Presentation | TLS                        | TLS or IPSEC mandatory                               |
| 7   | Application | HTTP(s)                    | HTTP default                                         |

### Message Format
- **SOAP**
- **REST**
- **TLV**

### Message Encapsulation
- **XML**
- **XML**
- **JSON**
- **Byte encoded**

3 format classes

4 options
Standard Message Structure

Registration

Verification

Availability

Message Header
- Message parameter fields

Device Identity
- Uniquely identifying information

Device Description
- Operating environment

Transaction Specifics
- Required information

Security Parameters
- Security implementation

Extensions
- Developer Codes and Proprietary Features
Schedule 1: Database Operating Guidelines

- First Draft March 09
  - Attention focused on Device Interoperability in March and April
  - Renewed expressions of interest and commitments from group members for contributions and editorial support
- Targeting June for V1.0
Schedule 2: Device Interoperability

- **V1.0 (~June)**
  - Publication
  - WINNForum Adoption
  - Group Consensus

- **Security (~May)**
  - User Protections
  - Ecosystem Security
  - Data Protection
  - Identity Management

- **Communications (~April)**
  - Internationalization
  - Device Operation
  - Device Initialization
DSA / White Space Interoperability Work Group

Join at