



Open API for CAT iq

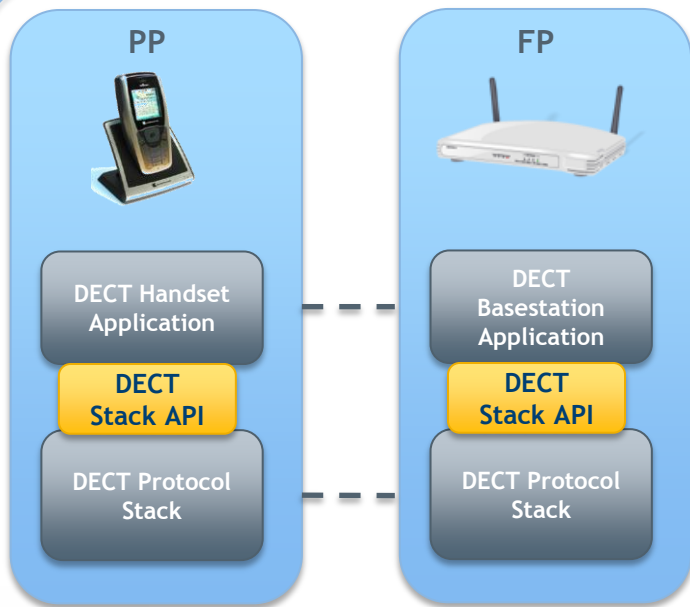
CAT iq Dev. Conference 2011

Hari Ramasubramanian

System Software Architect, DECT and VoIP

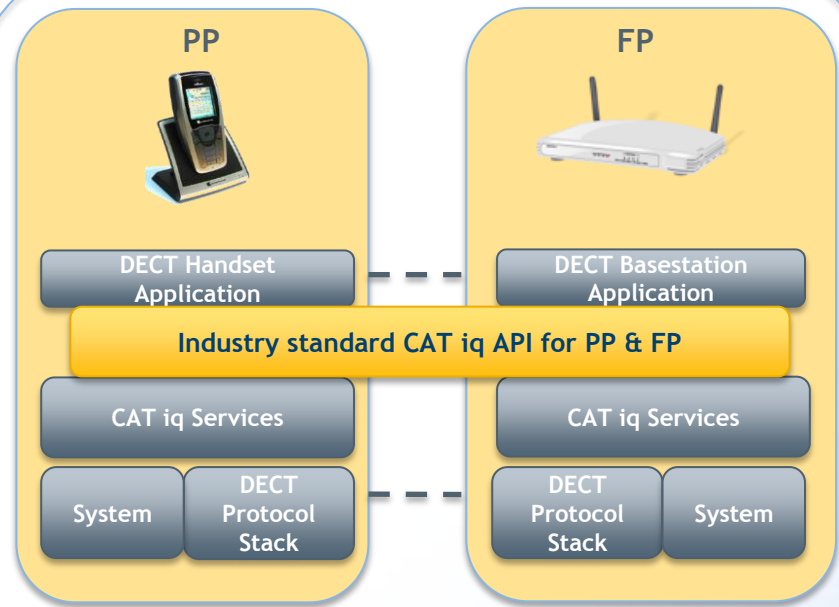
21st & 22nd Sep 2011

CAT iq API - Recalling last year's discussion ...



Simple protocol aggregation

to



Service level aggregation

Services

- Management - Registration, Capability mgmt & Paging
- Call - Basic, Supplementary and Parallel calls
- List - Session management, standard & proprietary lists
- Data - SUOTA and content download
- Utilities - Notifications and Synchronization
- Vendor Specific - Diagnostics, Debug, etc

Summary

- ▮ Unified CAT iq API will help to bridge the requirements gap & accelerate CAT iq deployments
- ▮ Reduction of complexity in development of CAT iq products
- ▮ In order for DECT and CAT iq to compete effectively against other technologies, DF should consider setting up a development community to define & standardize CAT iq API

Further study into this topic throws more questions.....

Γ Application scenarios involve multiple layers

- Does one CAT iq API cater to all ?
- What are the minimum requirements ?

Γ Is the scope of CAT iq API just voice telephony ?

- ULE finding its feet, it needs to be covered within the API

Γ What are the platforms to implement the API

- Provide the API for the available ones to start with

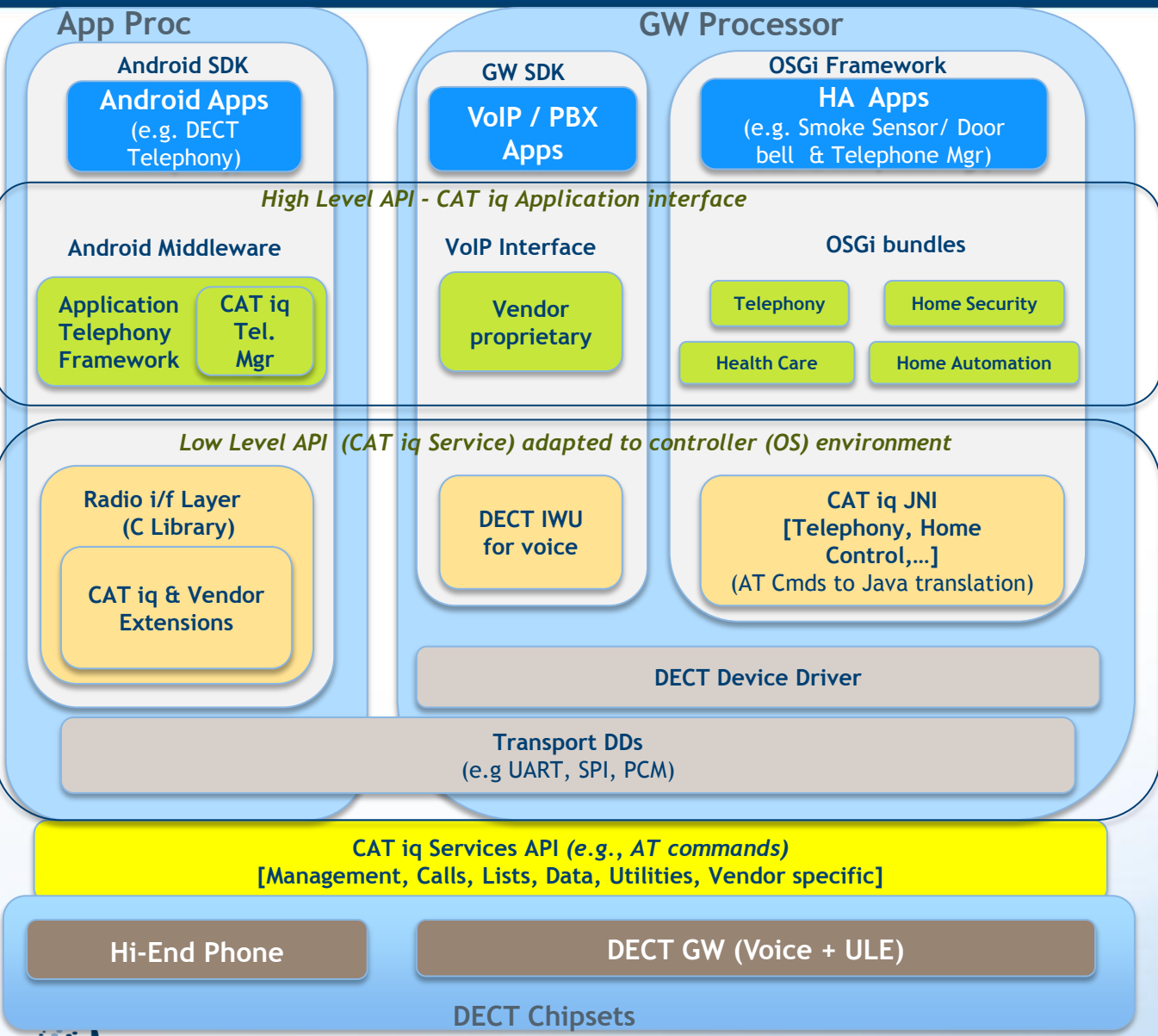
Γ Key Stakeholders for the API

▪ Ecosystem consists of

- Chipset vendors, System developers, Telcos, Home Appliance vendors (E.g White goods), Open source SW developers
- Certification / Standardization bodies (Liaisons with DF)
 - » Specifications
 - » Products

▪ Ownership for requirements, definitions and implementation amongst stakeholders

CAT iq - API App. Scenarios (E.g., Telephony & HA) **Animated*



- **CAT iq API (Low Level)**
 - ✓ CHIP vendor provided
 - ✓ Easy adaptable to different apps.
 - ✓ Industry standard for all CHIP vendors
- **Drivers to the DECT chipsets**
- **API adaptation to controller SW blocks**
 - ✓ CAT iq JNI, Android RIL, DECT Voice IWU
- **CAT iq High Level API**
 - ✓ OSGi Bundles
 - ✓ Bundles for ULE profiles
 - ✓ Telephony Profile
 - ✓ Android CAT iq Manager - Not much reuse with the 3GPP
- **App Scenarios**
 - ✓ Android Phone (PP)
 - ✓ CAT iq GW (voice)
 - ✓ CAT iq GW (Voice & HA)

CAT iq Service API - Low Level API

Γ Service API

- Mirrors the radio interface behaviour as defined in ETSI CAT iq specs
- Applicable for FP, PP and ULE
 - » ULE interfaces should be brought in under the same umbrella in future

Γ Based on AT Commands

- Text based
- Used in mobile world and very familiar (3GPP)
 - » Reuse of 3GPP command defns possible, parameters to be redefined
- High-level interface, abstracting protocol specifics
- Scalable and extensible, Vendor proprietary extensions are easy to introduce
- Functional or message based
- PP Instance management - Enhancement over standard AT commands

Γ Standardization

- DECT AT cmds defined in ETSI TR 102 179 V1.1.1 (2003-03), but inadequate for CAT iq
 - Lantiq can submit current definitions to the working group for reviews
 - Further standardization work on the services API can be taken under the purview of this spec



AT Commands for FP - Sample listing

4.1.3.1 ATD
Make an outgoing internal/external call.

Table 5 Command Description

Cmd	Parameter Description			Default	Command Syntax CVoIP->GW
	Syntax	Type	Description		
D	<ctxid>	M	Context id For call services commands, the context id points to the handset id, Range [1..6].	NA	ATD <ctxid>, <cid> [,<Number String>] [,<id=<id>] [,<ctype>]
	<cid>	M	Call id for the call	NA	[,<cotype>]
	<String>	O	Dialed Number for an outgoing voice call (or) URL (enclosed within "") for an outgoing data call. For list access, this parameter may be empty.	NA	[,<codec1>] [,<codec2>] [,<codec3>] [,<chnlid>]
	<lid>	O	Line Id 0-FP line selection <non-zero>-Valid line id from PP Ignore for Internal call type	0	
	<ctype>	O	Call Type 0 - Internal 1 - External 2 - Data	0	
	<cotype>	O	Connection Type 0 - Narrowband 1 - Wideband	1	
	<codec1>	O	First codec in the codec list	2	

AT Commands for PP - Sample listing

The screenshot shows a PDF viewer window titled 'COSIC_PLUS_SW_Rel1.0_SWO_Rev0.3 - PDF-XChange Viewer'. The left sidebar contains a 'Bookmarks' tree with the following structure:

- 3.1 AT Commands
 - 3.1.1 V.250 commands
 - 3.1.2 Responses for commands
 - 3.1.3 Call Service
 - 3.1.3.1 ATD** (selected)
 - 3.1.3.2 +CDIALING
 - 3.1.3.3 +CALERTING
 - 3.1.3.4 ATH
 - 3.1.3.5 +CA
 - 3.1.3.6 ATA
 - 3.1.3.7 +COAP
 - 3.1.3.8 VTS
 - 3.1.3.9 +CRING
 - 3.1.3.10 +CLIP
 - 3.1.3.11 +CCWA
 - 3.1.3.12 +CHLD
 - 3.1.4 Configuration Services
 - 3.1.4.1 +CCFR
 - 3.1.4.2 +CCFW
 - 3.1.4.3 +CLAHR
 - 3.1.4.4 +CLAHW
 - 3.1.4.5 +CLMR
 - 3.1.4.6 +CLMW
 - 3.1.4.7 +CLCR
 - 3.1.4.8 +CLCW
 - 3.1.4.9 +CINR
 - 3.1.4.10 +CINW
 - 3.1.4.11 +CIND
 - 3.1.4.12 +CTLS
 - 3.1.5 Registration Service
 - 3.1.6 General List Service
 - 3.1.7 Phonebook Service
 - 3.1.8 Call Register Service
 - 3.1.9 Audio Service
 - 3.1.10 Utility Service
 - 3.1.11 Diagnostic Service
 - 3.1.12 Data Services
- 4 Sequence diagrams
- References

The main content area displays the following text:

3.1.3.1 ATD

Make an outgoing internal/external call.

Table 11 Command Description

Cmd	Parameter Description			Command Syntax
	Syntax	Type	Description	
D	<Dial String>	O	Dialed Number for an outgoing voice call (or) URL (enclosed within "") for an outgoing data call. "*" can be used for an internal call to all handsets.	NA ATD [<Dial String>] [,<lid>] [,<ctype>]
	<lid>	O	Line Id 0-FP line selection <non-zero>-Valid line id Ignore for Internal call type	0
	<ctype>	O	Call Type 0 - Internal 1 - External 2 - External DCIBS 3 - Data	0

3.1.3.1.1 Response description

Refer to **OK** and **+CME ERROR** for the response to this command. The specific error codes applicable for this response are listed below:

Table 12 Error Codes

Error String	Code

CAT iq Services API for ULE - Initial Ideas

Γ Services API

- Device
 - Device Types, Manufacturer Info, Capabilities, Service discovery
- Network topology
 - Placing the device in the NW
 - » Registration, Identity, Addressing, mobility management
 - » Failures and recovery
- Configuration
 - Device and Network, data models
- Communication
 - » Sync & Async Modes, Packet formats, framing, Information elements
 - » Reliability & Security
- Diagnostics & Monitoring
 - » Device & Network, Logging
- Transparent interface for application specific requirements
 - Common methods for all types ULE devices till, for e.g., transport layer
- Sync with services API for Voice
- Possible adaptation layer for a Java environment (e.g CAT iq JNI)

CAT iq Application API (Android) - High Level API

Γ CAT iq Telephony Manager (High level API)

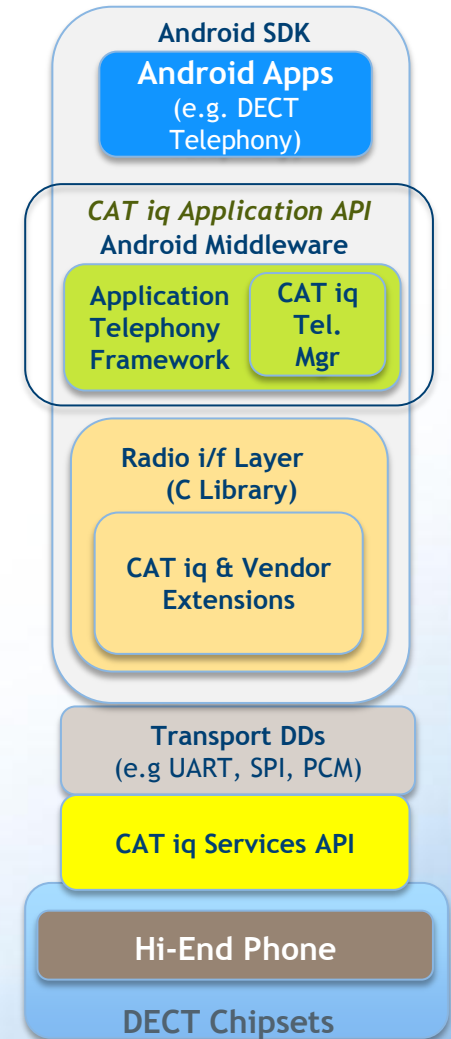
- Enhancement of the Android Telephony Manager to incorporate CAT iq features
 - » Many aspects of CAT iq unrelated to 3GPP telephony (e.g registration, paging, etc)
 - » An independent Telephony Manager for CAT iq forms the integration layer for Apps integration (e.g Dialer)

Γ RIL

- Uses 3GPP AT commands for standard mobile use cases
- Is a chipset vendor delivery
- Needs mapping classes within the Telephony framework
- Still low level in the integration chain

Γ Standardization

- Possibilities for coordinated action within the CAT iq developer's community
- Can the recommendations from DECT community be a part of the standard Android SDK ?



CAT iq Application API (OSGi) - High Level API

Γ Gateway Bundles (e.g., OSGi bundles)

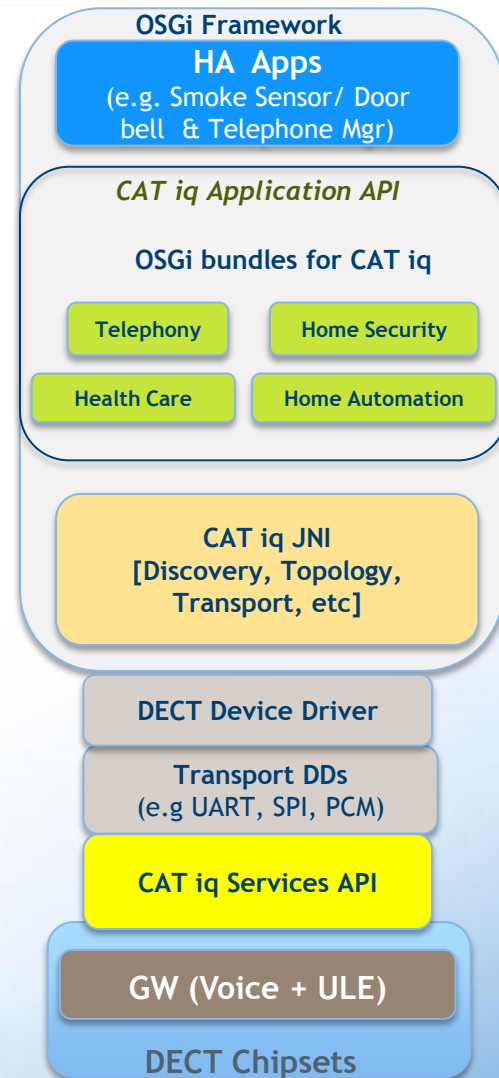
- For managing ULE devices
 - API needs to address all the profiles (Home control, security, Smart metering etc) of the ULE devices
- For managing the Telephony devices (DECT handsets)
 - Interconnection between Telephony and Home control bundles. For e.g., voice pendent or a handheld control use case
- Run-time installable bundles
 - Users can install bundles from the service provider “Apps” store.

Γ CAT iq JNI (Java Native Interface)

- Translation layer - Services API in a host environment
- Low level and profile independent
- Primarily takes care of DECT technology specifics

Γ Definition

- Further discussions with telcos, OSGi, DF and other bodies that standardize Home Automation devices behaviour



CAT iq API - Summary

Γ CAT iq Services API

- Basic building block for any DECT system
 - Required, irrespective of the availability of the High Level API
- Critical from every DECT/CAT iq Chipset vendor's point of view
 - Definition and implementation - Responsibility of DECT chipset vendors

Γ CAT iq Application API

- Part of a framework from where different app. scenarios can be built
- Facilitates independent apps development (faster TTM)
 - E.g., CAT iq based Telephony framework can spin off many apps in Android
- Opens up newer domains for CAT iq / ULE
 - GW (Voice + ULE) is a competitive offering , Can accelerate ULE deployments

Thank You

