Gobi™ SDK—Developing Code to Connect, Locate, and Manage 3G/4G Data Devices

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Agenda

• Introduction to Gobi
• Moving from AT Commands to Common API
• Gobi API Benefits
• What can I do with the API?
• Q&A
Qualcomm: Driving Computing and Mobility

BRINGING COMPUTING TO MOBILE DEVICES

BRINGING MOBILITY TO COMPUTING DEVICES

2011 UPLiNQ CONFEERENCE

Where mobile links up.
Gobi Now Available > 100 Different Devices
Extending Wireless Leadership to All Connected Devices
Gobi API—Flexible and Scalable

Applications developed by:
1. Carriers
2. OEMs
3. Independent Software Vendors (ISVs)
   - Location-Aware, Tracking, Navigation
   - Security, Mobile Device Management

Flexible Interface

Driver

Gobi Compliant HW Qualcomm Chipsets

Value-Add Applications

C/C++ API

VBScript
Perl
Jscript CLI
WMI

Connect

Laptops/Netbooks
USB Dongles
Tablets E-Readers
Routers

Locate

Gobi API

Modem
GPS
NDIS

Manage

USB Bus Driver
Module Hardware (Gobi compliant)
Moving From AT Commands to Common APIs

• Historically, AT commands have been the primary method available to interface with cellular modem
• Qualcomm’s Gobi technology introduces a mobile broadband API which is common across
  – Air interface: CDMA, HSPA, HSPA+, and LTE
  – Operating System: Windows, Chrome OS, Android
• Qualcomm is encouraging the industry to move to common APIs such as the Gobi API to provide a better user experience
Challenges of Legacy AT Commands

1. Modality
2. Concurrency
3. Performance
4. Fragmentation
1. Modality

- Each AT command bus may be in one of two states
  1. Command state
  2. Data state
- When in “data state” the modem can no longer be accessed or managed
- Transition to “command state” requires non-standard in-band escape sequence
- Only one AT command may be issued at a time
2. Concurrency

• Only one app can use an AT command interface at a time. Requires an additional AT port
  – Apps that autostart under the covers can block other CMs
• Reality: multiple applications need to access the device interface at the same time
  – Connection Manager(s)
  – GPS application
  – SMS widget
  – Set-up Portal
  – Manageability client
  – EAP/SIM
  – VoIP client
  – VPN client
3. Performance

- Serial interface requires HDLC framing for data transfer which incurs significant overhead
- Dial-up networking (DUN) using PPP is not conducive for 3G/4G mobile broadband access
  - Circuit-switched model
  - Device appears as a landline modem to the OS and User
  - Requires the user or application to initiate all data connections
4. Fragmentation

- Different AT command models for each technology (UMTS, CDMA, LTE)
- Operator-specific AT commands
- Results in fragmentation, high SW development costs, and great effort to support 3G/4G connectivity
Introducing the Gobi™ API

• First mobile broadband API that is common across
  – Air interface: CDMA, HSPA, HSPA+, and LTE
  – OS: Windows, Chrome OS, Android
• Simultaneous data and control
• Highly optimized data path (802.3 or Raw IP)
• Flexible, scalable, and portable architecture
What is the Gobi SDK?

- The Windows Gobi SDK* provides a common set of C/C++ APIs with sample code for developing connection managers, GPS apps, and/or manageability solutions on wireless devices based on the following Qualcomm chipsets:

  MDM9600  MDM6600  MDM2000
  MDM9200  MDM6200  MDM1000
  MDM8220

Why Qualcomm?

- The Gobi API from Qualcomm provides support for the broadest range of 3G/4G modules in the industry allowing you to write once and reuse code across multiple platforms (tablets, notebooks and machine-to-machine devices) spanning multiple operating systems (Windows, Chrome OS, Android)

* Windows Gobi SDK is available at http://www.qdevnet.com
What Can I Do With the Gobi API?
Three High-level Use Cases—Gobi API

Connect
- Wireless Data Service (WDS)
  - CDMA
  - 1xRTT/EVDORevA/B
  - EDGE/GPRS
  - WCDMA
  - HSDPA/HSUPA
  - HSPA+/DC-HSPA+
  - LTE
- Network Access Service (NAS)
- SMS Service

Locate
- Position Determination Service (PDS)
  - Standalone GPS
  - Assisted GPS w/XTRA
- Win7 Location Sensor Support

Manage
- Device Management Service (DMS)
- Firmware Management*
- Card Application Toolkit (CAT)

* Supported on select EVDO/HSPA multimode devices only, refer to hardware specifications
Examples—Connect to 3G/4G Networks

Connect

- Wireless Data Service (WDS)
  - CDMA
  - 1xRTT/EVDO Rev A/B
  - EDGE/GPRS
  - WCDMA
  - HSDPA/HSUPA
  - HSPA+/DC-HSPA+
  - LTE
- Network Access Service (NAS)
- SMS Service

- Use the same APIs to start/stop data session regardless of air interface (EVDO, HSPA, LTE, etc…)
  
<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Externally Connected</td>
</tr>
<tr>
<td>RSSI (dB)</td>
<td>-78</td>
</tr>
<tr>
<td>Technology</td>
<td>HSDPA DL, HSUPA UL</td>
</tr>
<tr>
<td>Current RX Rate (bps)</td>
<td>240800</td>
</tr>
<tr>
<td>Current TX Rate (bps)</td>
<td>3440</td>
</tr>
<tr>
<td>Maximum RX Rate (bps)</td>
<td>14000000</td>
</tr>
<tr>
<td>Maximum TX Rate (bps)</td>
<td>20000000</td>
</tr>
<tr>
<td>Roaming Indicator</td>
<td>1</td>
</tr>
<tr>
<td>Connection Duration</td>
<td>01:52:29</td>
</tr>
<tr>
<td>Life Total Connection Duration</td>
<td>01:57:35</td>
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<tr>
<td>Life Total RX Bytes</td>
<td>15203177</td>
</tr>
<tr>
<td>Life Total TX Bytes</td>
<td>1504981</td>
</tr>
</tbody>
</table>

- Develop connection manager using same code base, reducing time-to-market and development costs

  StartDataSession()
  StopDataSession()
  GetConnectionRate()
  GetIPAddress()
  GetPacketStatus()
  GetDataBearerTechnology()
  GetByteTotals()
  GetSessionDuration()
Examples—Location-based Services

**Locate**

- Position Determination Service (PDS)
  - Standalone GPS
  - Assisted GPS w/ XTRA
- Win7 Location Sensor Support

- Qualcomm’s leading gpsOne® solution for smartphones is also available in laptops and tablets

- Use Gobi API to track physical device, setup geofence and alerts, provide navigation software, location-aware apps, and/or advanced geo-spatial systems for large enterprise/government
Examples—Mobile Device Management

Manage

- Device Management Service (DMS)
- Firmware Management*
- Card Application Toolkit (CAT)

- Manage connection details like data transferred and roaming usage to help control costs
- Provide Mobile Broadband reports including consolidated views into inventory and connectivity data across users, networks, and devices.
- Secure data on device w/ remote data wipe

1 Inventory Management

<table>
<thead>
<tr>
<th>Device Name</th>
<th>IMEI</th>
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<tbody>
<tr>
<td>Model ID</td>
<td>IMSI</td>
</tr>
<tr>
<td>Firmware revision</td>
<td>MIN</td>
</tr>
<tr>
<td>MEID</td>
<td>MDN</td>
</tr>
</tbody>
</table>

2 Mobile Device Management

- Carrier name(s)
- Carrier Select
- Usage: historical and real-time
- International roaming
- Remote Data Wipe

Gobi API

* Supported on select EVDO/HSPA multimode devices only, refer to hardware specifications
Conclusions

• Gobi API is the first mobile broadband API that is **common** across:
  – Air interface: CDMA, HSPA, HSPA+, and LTE
  – OS: Windows, Chrome OS, Android

• Use a common API to develop code to connect, locate, and manage 3G/4G devices

• Gobi SDK now available for download at [http://www.qdevnet.com](http://www.qdevnet.com)
Q&A

Dependent on carrier operator and 3G network availability

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Thank you!

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