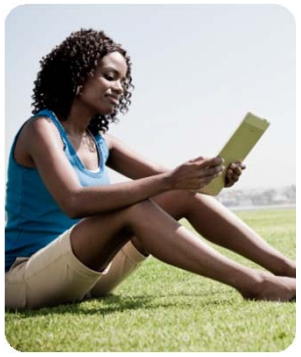
Open Source. Open Possibilities.



The AllJoyn™ Open Source Project

Marcello Lioy
Director, Engineering,
Qualcomm Innovation Center, Inc.

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Agenda

AllJoyn Overview

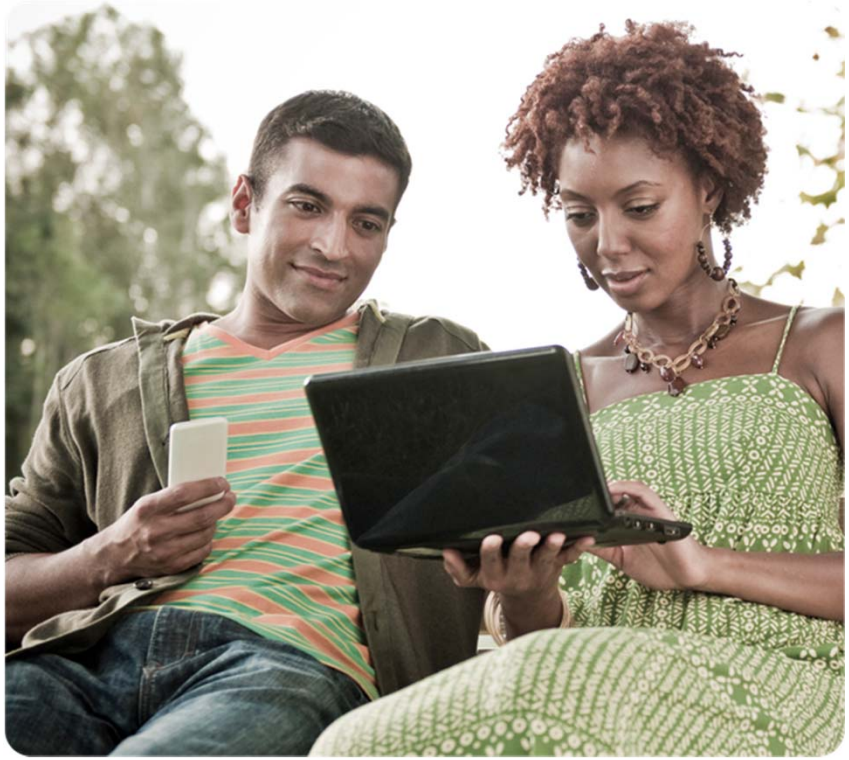
Architecture and Security Concepts

Performance/Deployment Considerations

Availability/Open Source

Q&A

Open *Source* | Open *Possibilities*



AllJoyn Overview

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What is AllJoyn?

AllJoyn enables ad hoc, proximity based, peer-to-peer, platform and bearer agnostic networking between devices and applications

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Why Peer-to-peer (P2P) Is Hard

AllJoyn

P2P Friction Developers Face Today

Open Source. Open Possibilities.

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AllJoyn Makes Peer-to-peer Frictionless

Discover devices and applications around you

Adapt to devices coming and going

Manage transports like Bluetooth and Wi-Fi and message routing across them

Interoperate across disparate operating systems and bearers

Exchange Information in a secure manner

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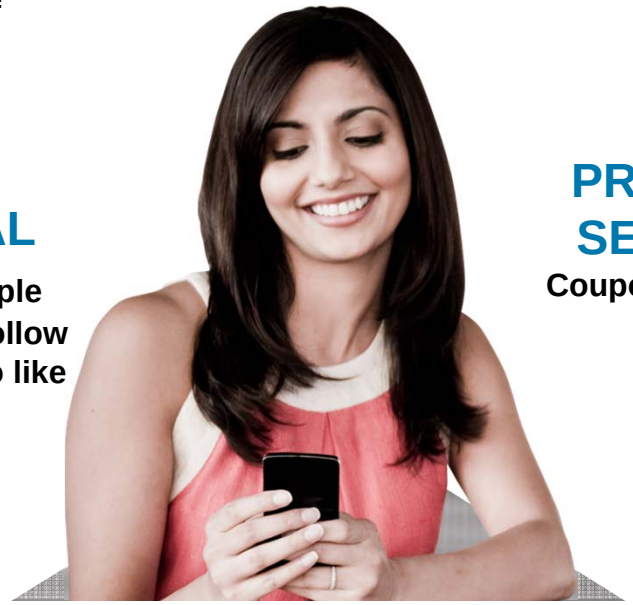
MEDIA SHARING
Trade pictures, videos or business cards

CHAT
Exchange tips, ask questions or taunt your opponent

PROXIMAL AWARENESS
Notification of others nearby

MULTI-PLAYER GAMING
Play head-to-head



SOCIAL
Find people nearby to follow or places to like

PROXIMAL SERVICES
Coupons & rewards

What new experiences can AllJoyn enable?

Open *Source* | Open *Possibilities*

Architecture and Security Concepts

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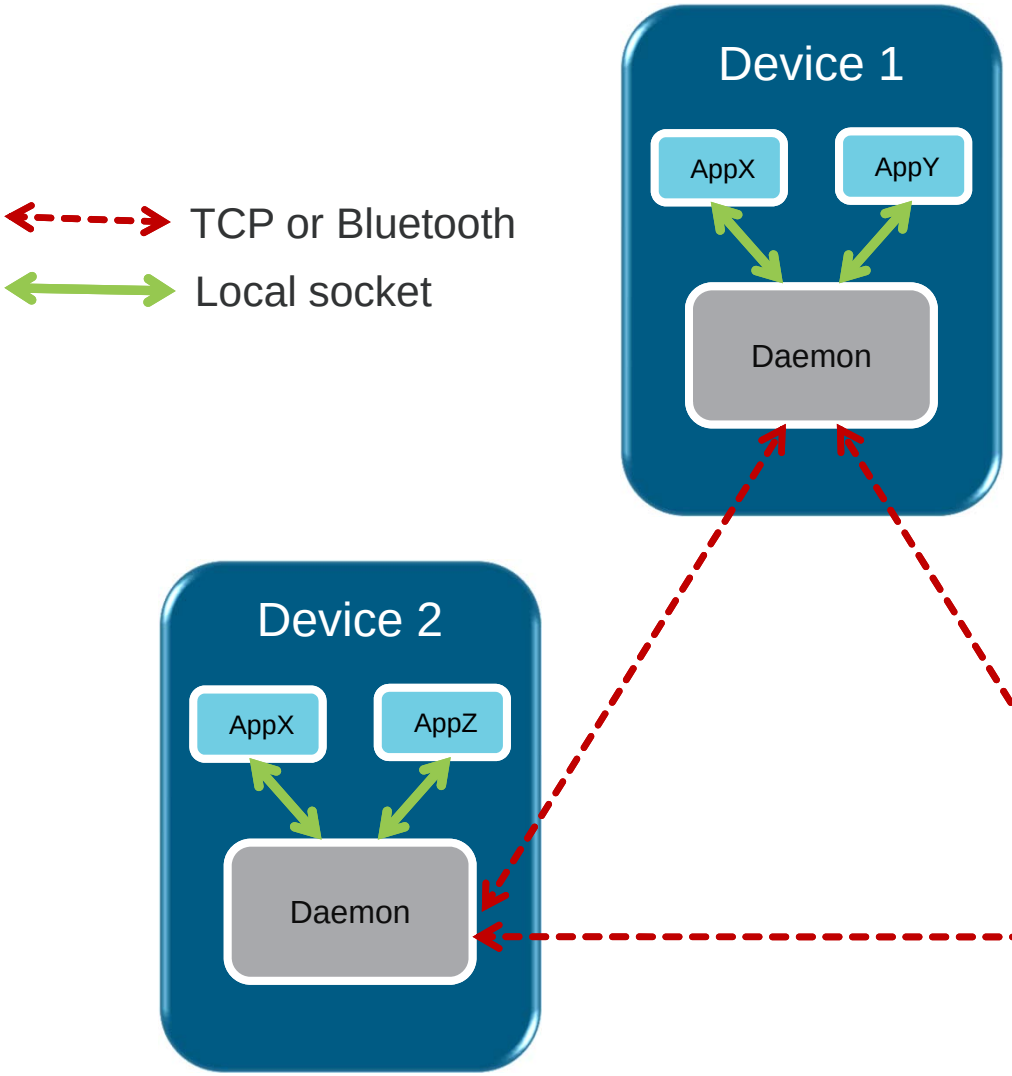
Overview

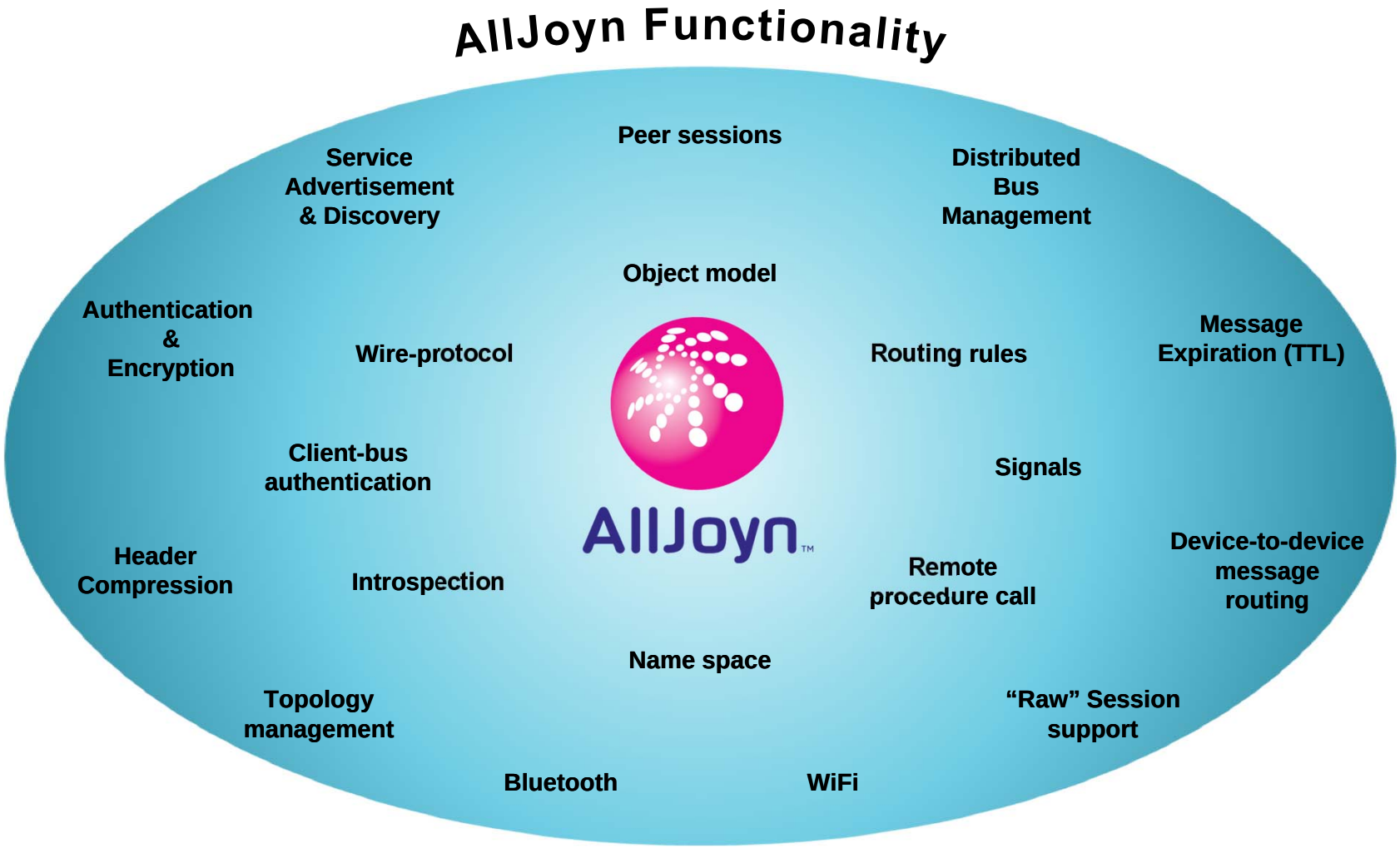
- Designed to be easily portable to new hardware and OS platforms
- AllJoyn is a distributed software bus
  - Each device runs a bus daemon
  - Applications communicate directly with daemon
  - Daemons handle cross device communication
  - A client library is used by applications to interact with the daemon
- Bus formation is ad hoc
  - Based on proximal discovery of applications/services
  - Abstracts link specific discovery mechanisms
- Protocol is link independent
  - Ground-up implementation of the D-Bus wire-protocol with extensions
  - Supports Wi-Fi and Bluetooth currently
  - WiFi Direct being worked on

Distributed Software Bus



- Conceptually ***peers*** are applications not devices.
- Applications communicate with a local daemon
- Daemons handle routing between devices

DBus Compatibility



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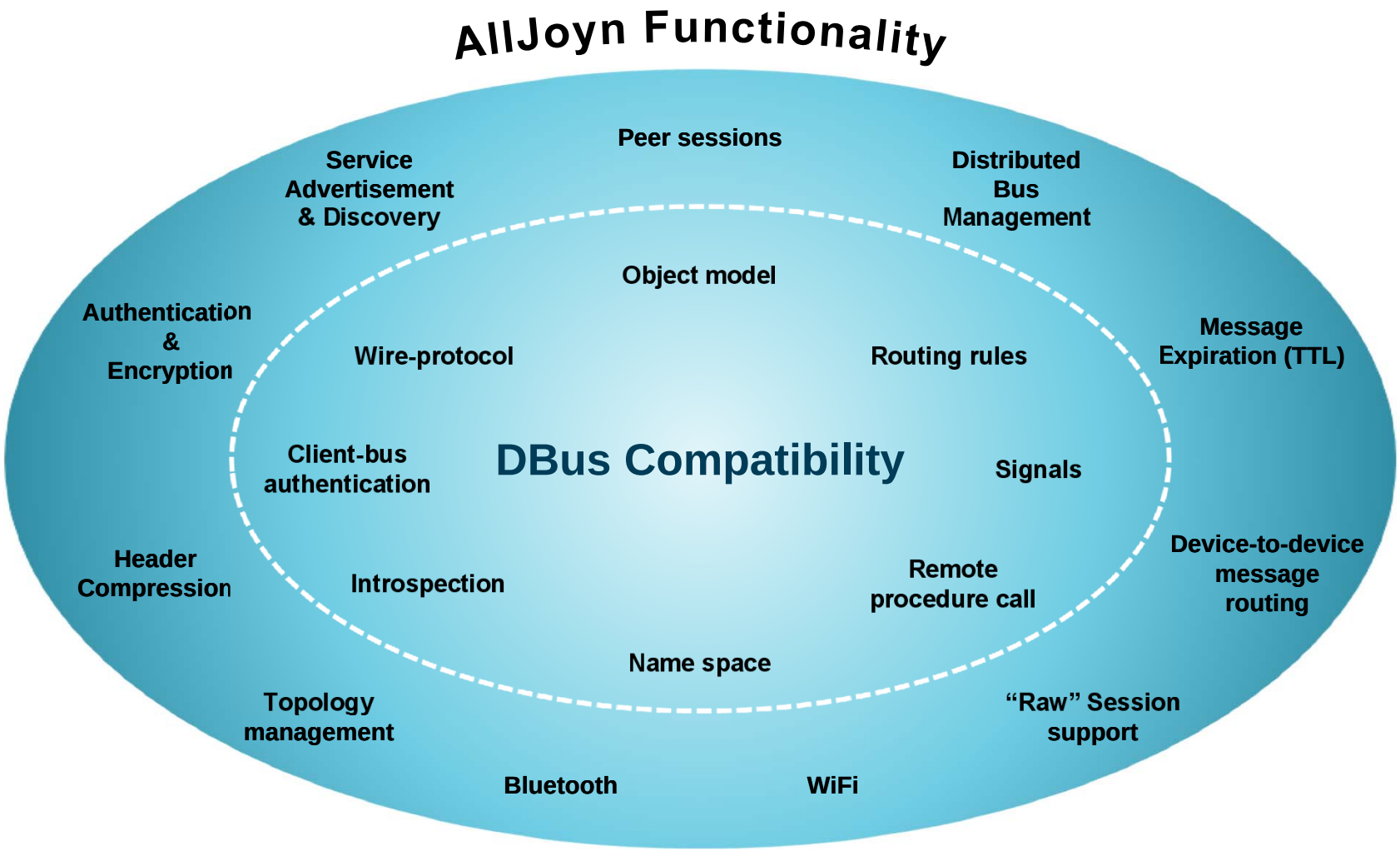
DBus Compatibility



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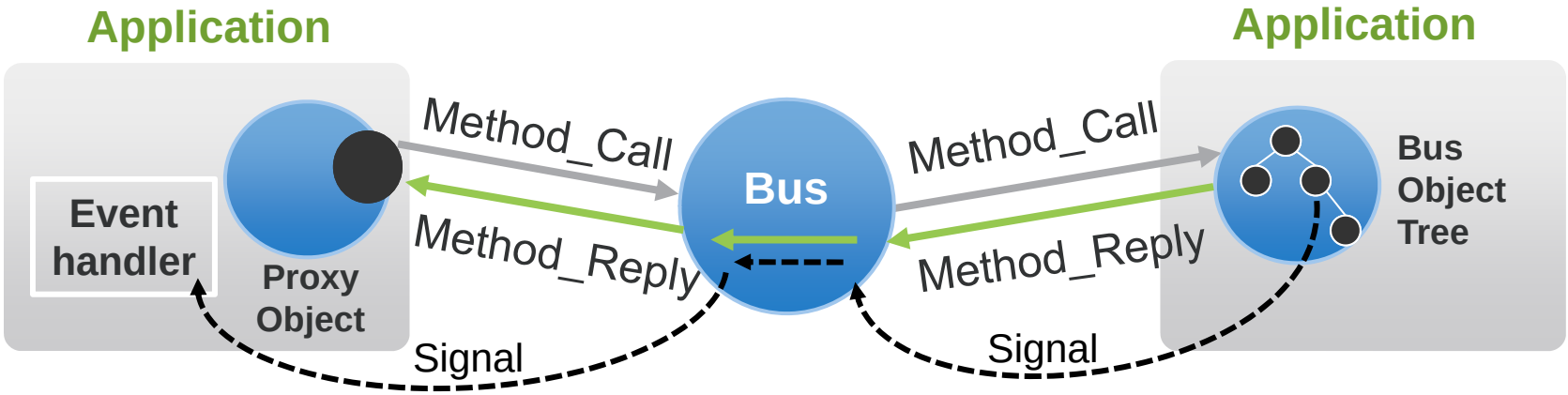
Object Model

- AllJoyn applications expose their functionality via objects
  - These are typically organized in a hierarchy
- Objects implement interfaces (one or more)
- Interfaces are composed of members, which fall into three categories
  - Methods — classic OO object interaction
  - Signals — asynchronous event notification
    - Can be broadcast, multicast or point-to-point
  - Properties — data members



Design of Security Framework

Authentication and encryption is designed to be app-to-app

- The bus is not involved other than to route
- Trust relationship established between the applications
- Device pairing not required unless the transport requires it
- In case of Bluetooth AllJoyn does not normally trigger pairing

Security is enabled per-interface

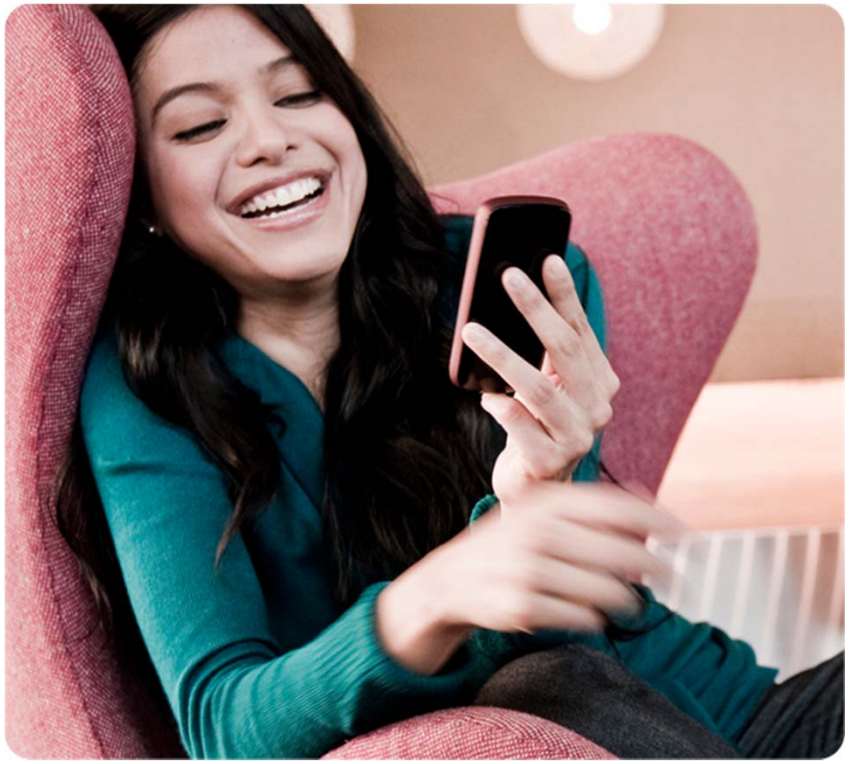
- Authentication and key exchange initiated on demand

Security-enabled interface

- Authentication is required to make method calls
- Authentication required to receive signals
- All messages are encrypted

Open *Source* | Open *Possibilities*

AllJoyn™



Performance/Deployment Considerations

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Message Optimizations

Header compression

- Designed to significantly reduce the size of message headers

Time to live

- Designed to support isochronous data (e.g. real-time streaming/gaming)

Multipoint sessions

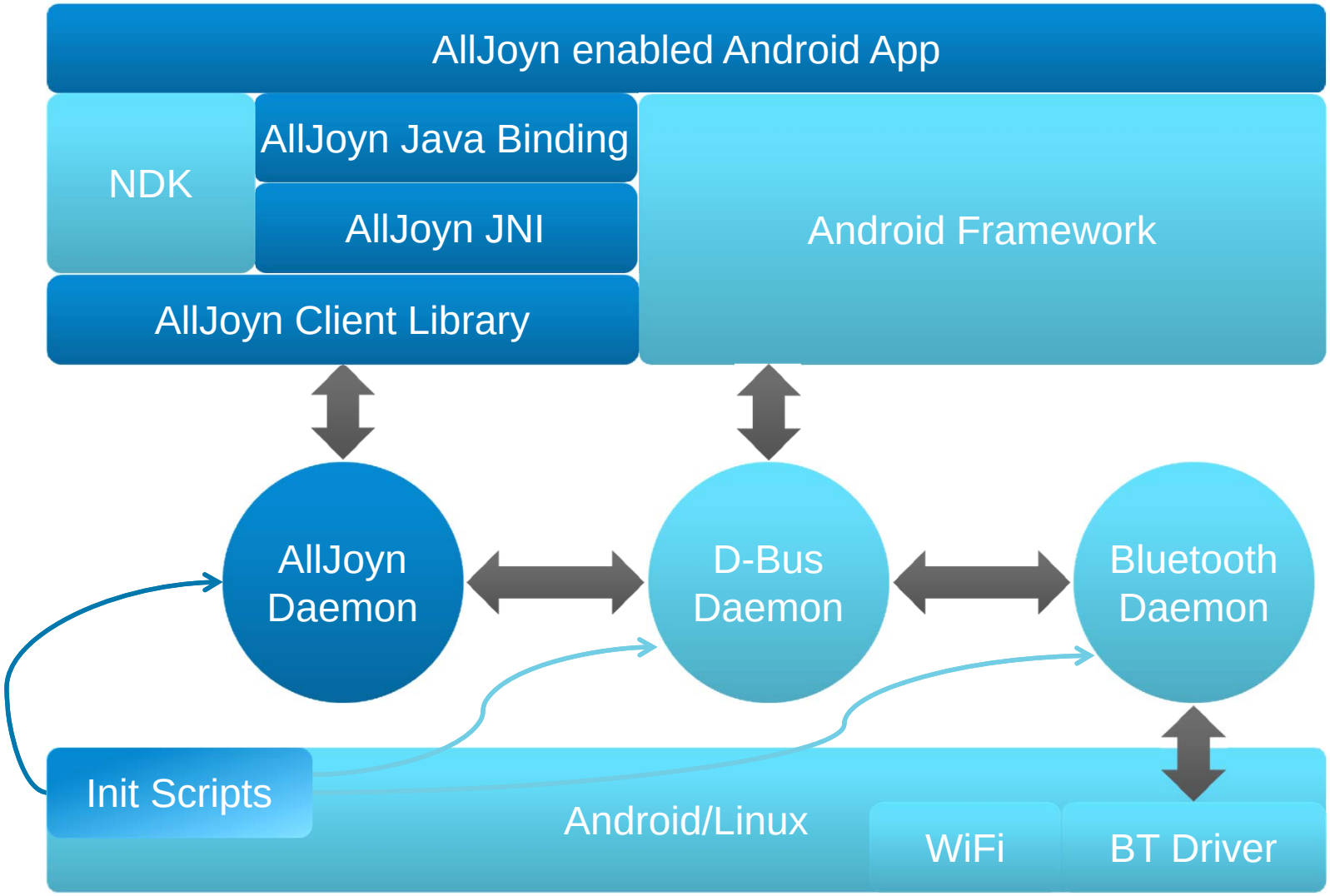
- Bounds the scope of broadcast signals to session members
- Provides mechanism for deciding when radios are no longer in use

These target an optimized experience on embedded devices

Deployment Options

- AllJoyn applications require the daemon to be running on the device
- There are three options for daemon deployment:
  - Platform integration
    - Single daemon for system, can use WiFi as well as BT today and WiFi Direct in future
    - Started at system startup via initialization scripts
  - Downloadable APK
    - Single daemon for system, restricted to WiFi only
    - Launched via intent
  - Bundled daemon
    - Daemon is bundled with the application
    - Also launched by intent
      - » Will only be used if neither other two is available
    - Each application will have it's own daemon instance

Integrating AllJoyn into Android



AllJoyn™

Availability/Open Source

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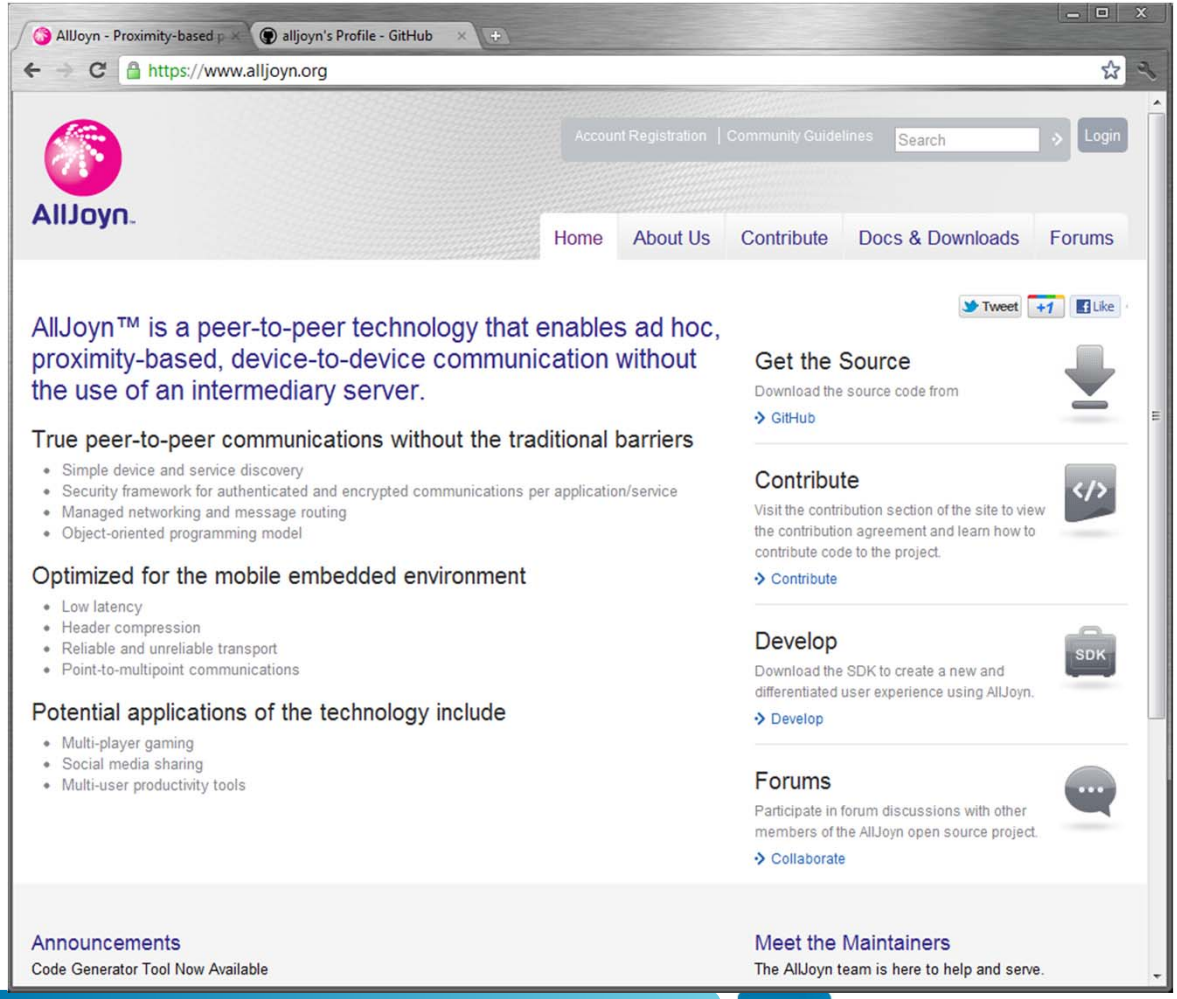
AllJoyn Open Source Project: www.alljoyn.org

- AllJoyn is an Open source project
- Accepting 3rd party contributions
- Source available on GitHub
  - http://alljoyn.github.com
- Binary SDKs available on alljoyn.org
  - Currently have Android
  - Soon will have Windows
- Recently released 2.3
- Licensed using Apache 2.0
  - Free to use and modify



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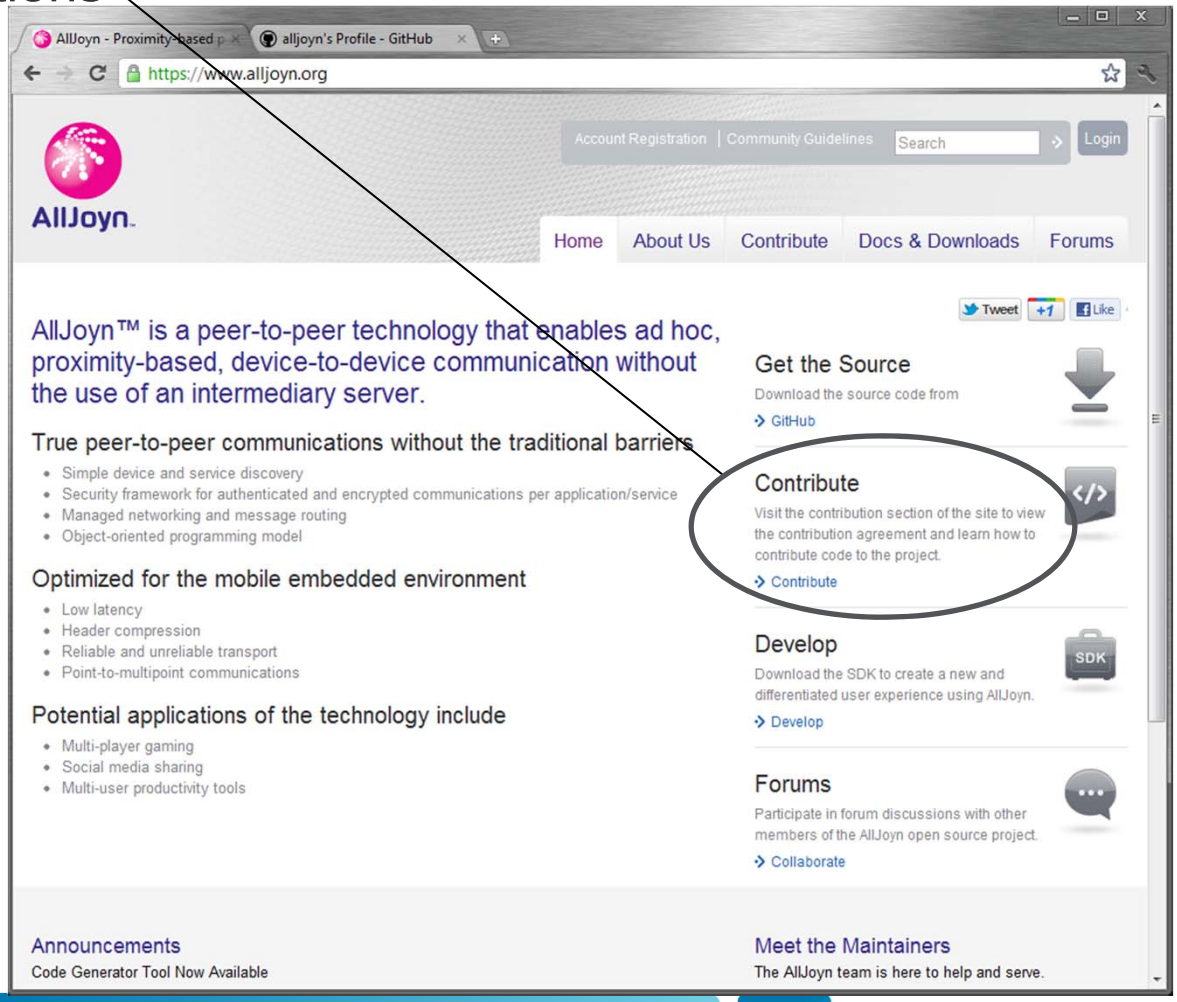

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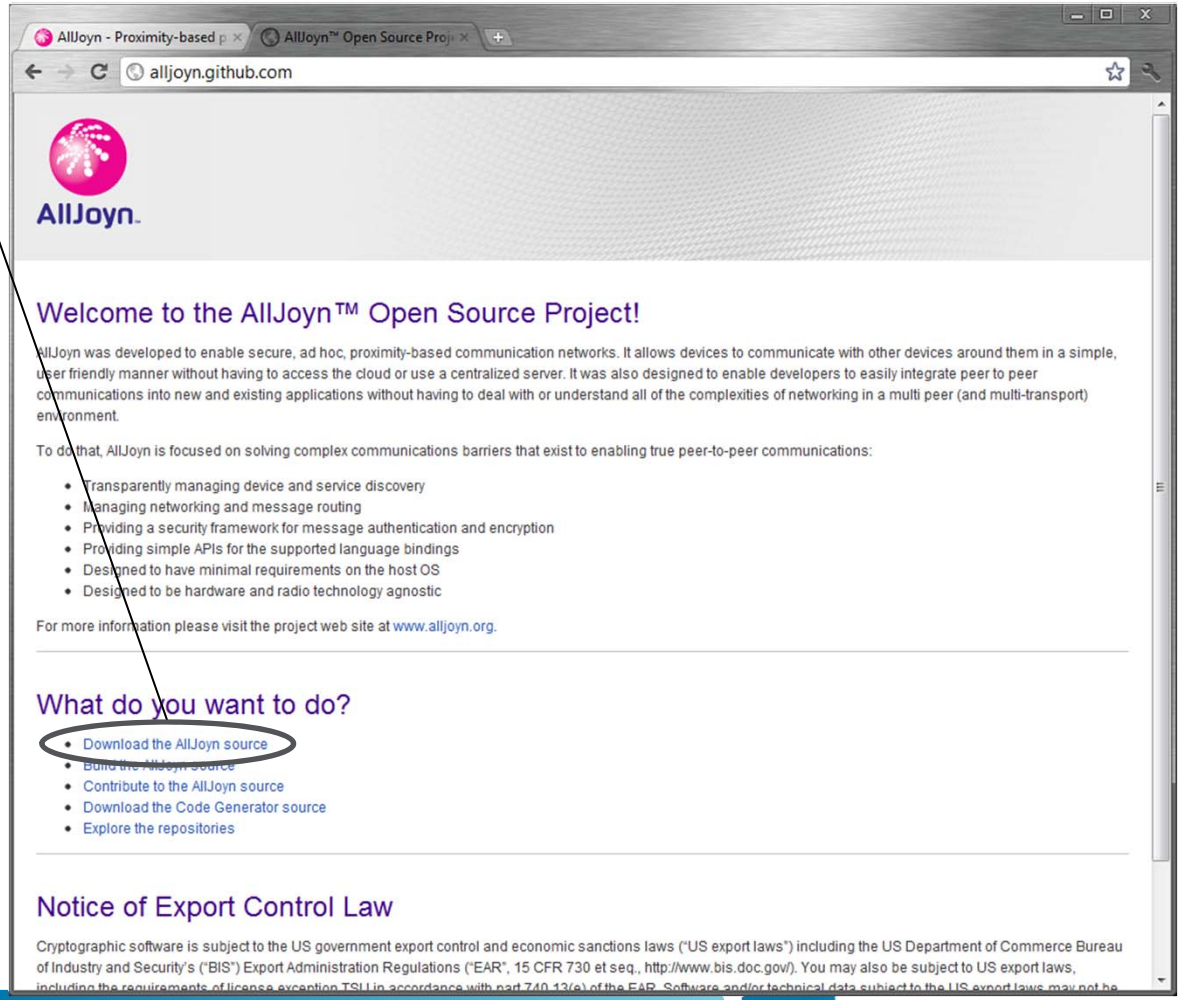

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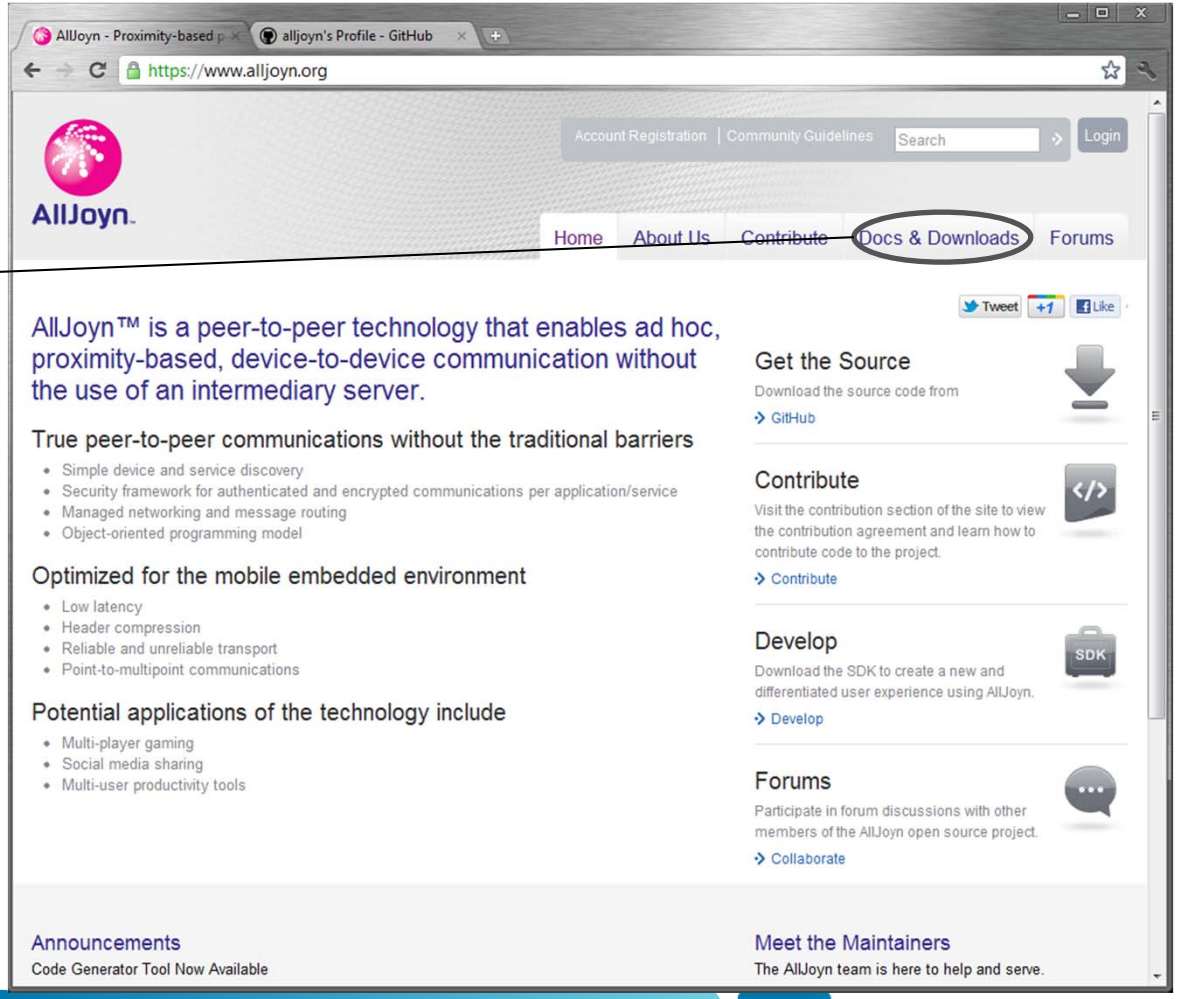

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