



REDEFINING MOBILITY



A Perspective on GPS/GNSS in Consumer Segment – Especially on Mobile Phones

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Smart Wireless (cell) Phones

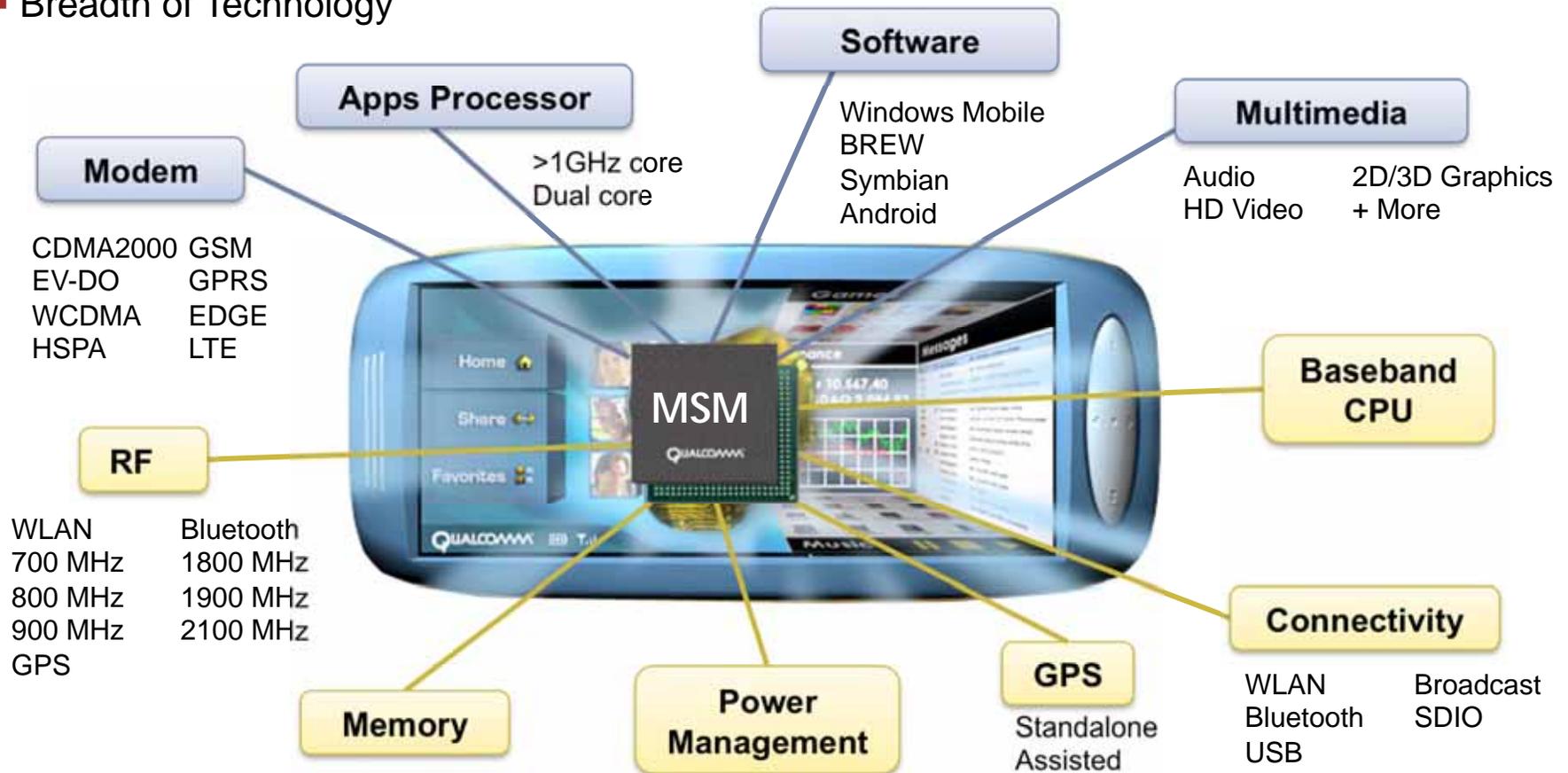
- High-speed cellular wireless connectivity for voice and data
- Rich multimedia and application (**including location**) capability



- How was this possible?
 - Moore's Law – relentless progress in silicon technology
 - Higher integration, lower cost, lower power
 - Shannon and advances in digital communications and air interfaces
 - Higher efficiency, capacity, lower capital costs.
 - **Free, open and reliable GPS**
 - **Key enabler of LBS and location on mobile phones**

Smartphone Needs a Complete System Solution

- Integration
- Architectural Consistency
- Breadth of Technology



Integration is key to driving advanced functionality to mass market

The Cell Phone Has Become the Biggest Platform Created



>1B 3G Subscribers Today
Expected to be ~2.8B by 2014

Note : 3G includes CDMA2000, WCDMA and TD-SCDMA

Source: Wireless Intelligence estimates as of April 19, 2010 for the quarter ending March 31, 2010, number of unique wireless connections.

Continuing Innovation in Advanced 3G Wireless – HSPA+



Device Traction

Operator Traction

Telstra Launched 21 Mbps service with plans to increase to 42 Mbps

Trends Driving Data Growth



3G subscriber growth

Application stores

Broadband connectivity

Video downloads

Flexible data rates

Shift to cloud computing

AT&T Has Seen 5000% Mobile Data Growth Over Past 3 Years

Software Solution and Open Application Platforms



symbian

palm webOS

BlackBerry



Google Chrome

Critical to foster and help to flourish ecosystem of applications developers.
Location has become key part of many mobile phone applications.

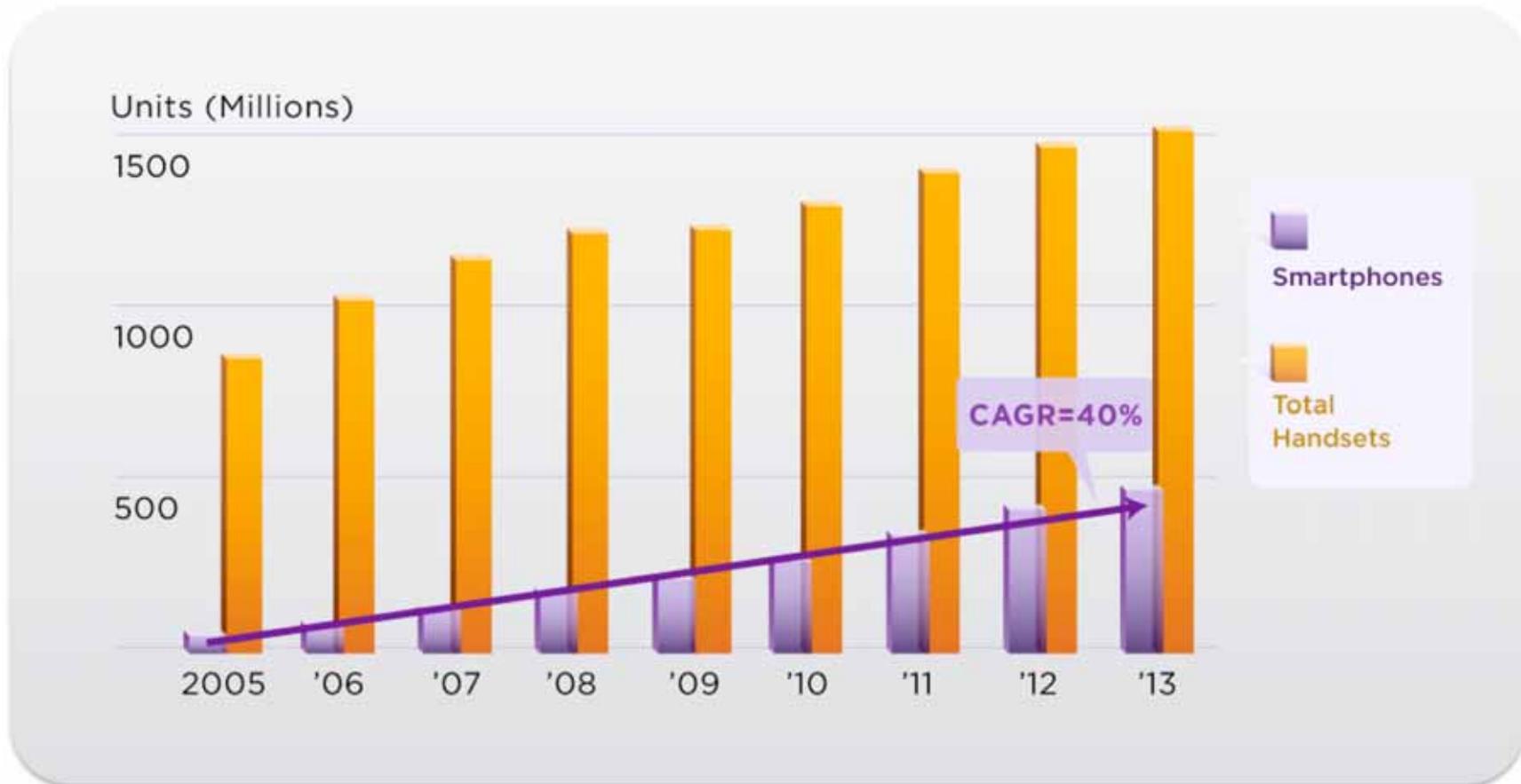
Enabling New Mobile Device Categories



First truly mobile computing device delivering the smartphone experience on a larger, high resolution touch screen:

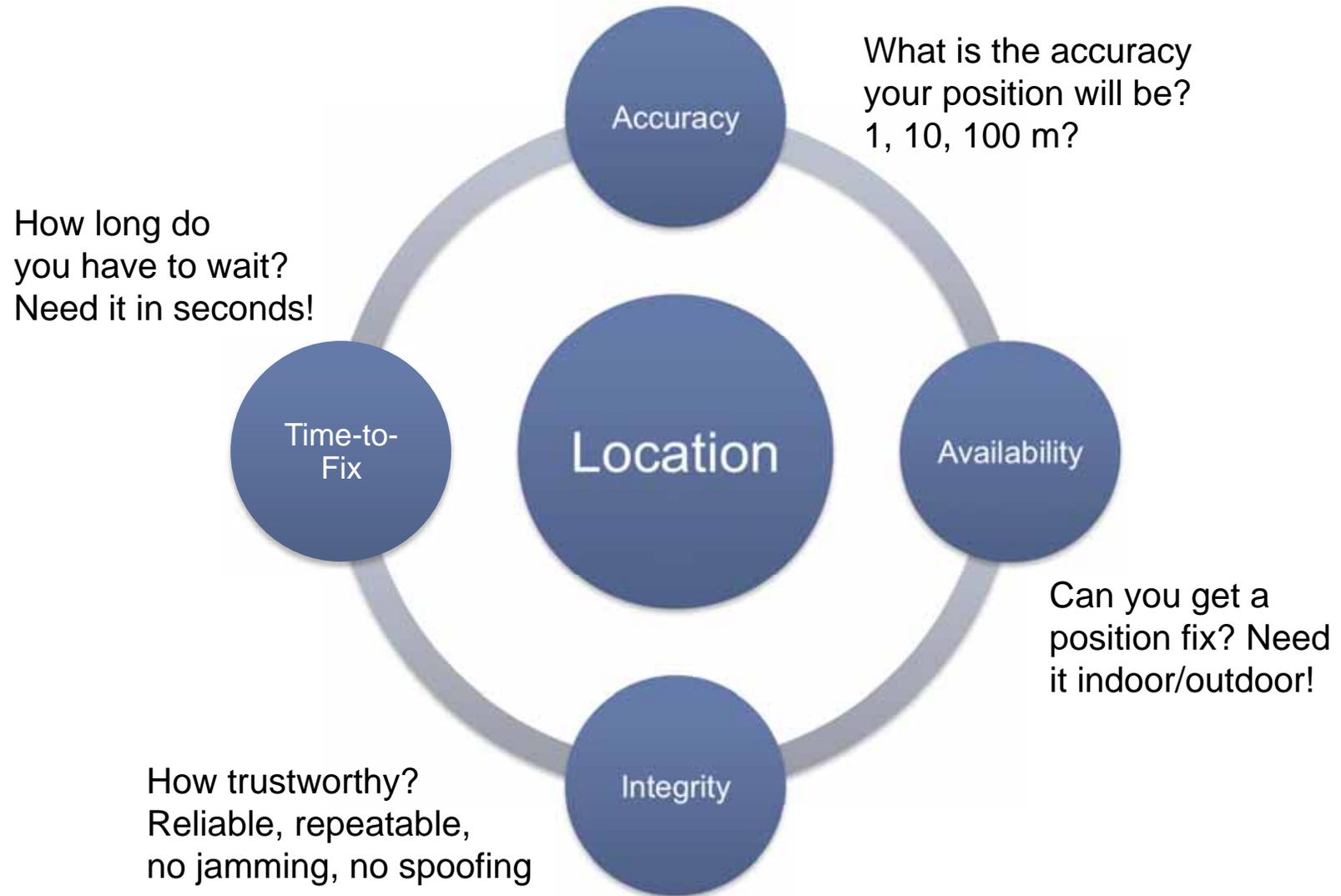
- **Always Connected & Aware** — 3G mobile broadband, WiFi, BT & GPS
- **Ultra-portable** — <2 lbs & <20mm thick with comparable battery life to a smartphone with day long use & week long standby time
- **Intuitive & Easy-to-use** — Instant on with a simple UI & custom OS that's optimized for web applications with a full Internet browser not the mobile equivalent
- **Location aware** — know where you are, know where you are going

Smartphones Shipments Projected to Grow at 40% CAGR Through 2013



Sources: Total Handsets: Average of ABI (Q4'08), Yankee (Q4'08), Gartner (Dec'08), IDC (Dec'08), WCIS+ (Q1'09), In-Stat (Oct'08) Smartphones – ABI (Q4'08) and Strategy Analytics (Nov'08)

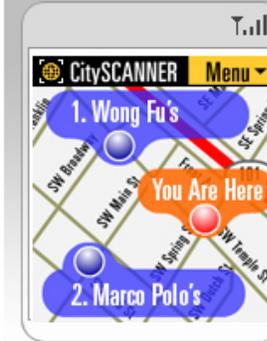
What Do Consumers Want for Location on Mobile Devices?



Ever Increasing *"wide variety"* of Location-Enhanced Services

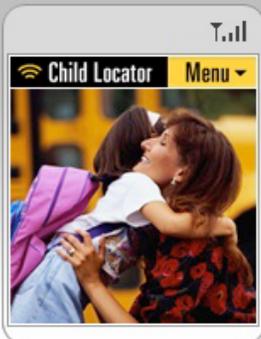
Location is a central part of mobile internet user experience

Infotainment



- City Guides
- Points of Interest
- Business Finder
- Weather
- Location-tagged Photos & Videos

Safety & Security



- Roadside Assistance
- Family Locator
- Asset Tracking

Navigation



- Car Navigation
- Pedestrian Navigation
- Traffic Information
- Public Transportation
- Scheduling

Recreation



- Running/jogging
- Fitness Training
- Cycling
- Hiking
- Fishing

Community



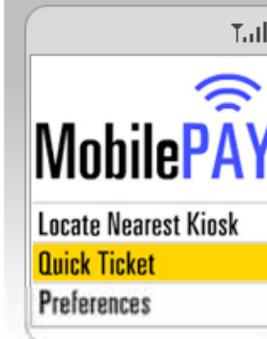
- Mobile Blogging
- Friend Finder
- Date Finder

Gaming



- Location Aware Games
- Multi-player location Games
- GeoCaching
- Treasure Hunt

Commerce



- Mobile Payment
- Mobile Coupons
- Realty Listings/Sales
- Rentals

Location on Mobile Devices Today – “Day In the Life”!



Phone Alert:
Time to Depart
for Meeting at
2:00. It will take
you 30 minutes
to get there

Integration with
Calendar/PIM

What a productive
day!

Thanks to GPS and
Location Services !!



Directions to quickest
route — inclusive of **traffic
details, rerouting, local
search, public
transportation schedules,**
etc.



Arrive ahead of time.
Look what’s around you.
Are any of your buddies
close by? Time for
Coffee – Search for
closest Starbucks!

Local Search, Friend
Finder



Send store directions,
picture, meet in 10 mins

Navigation, Advertising,
Networking



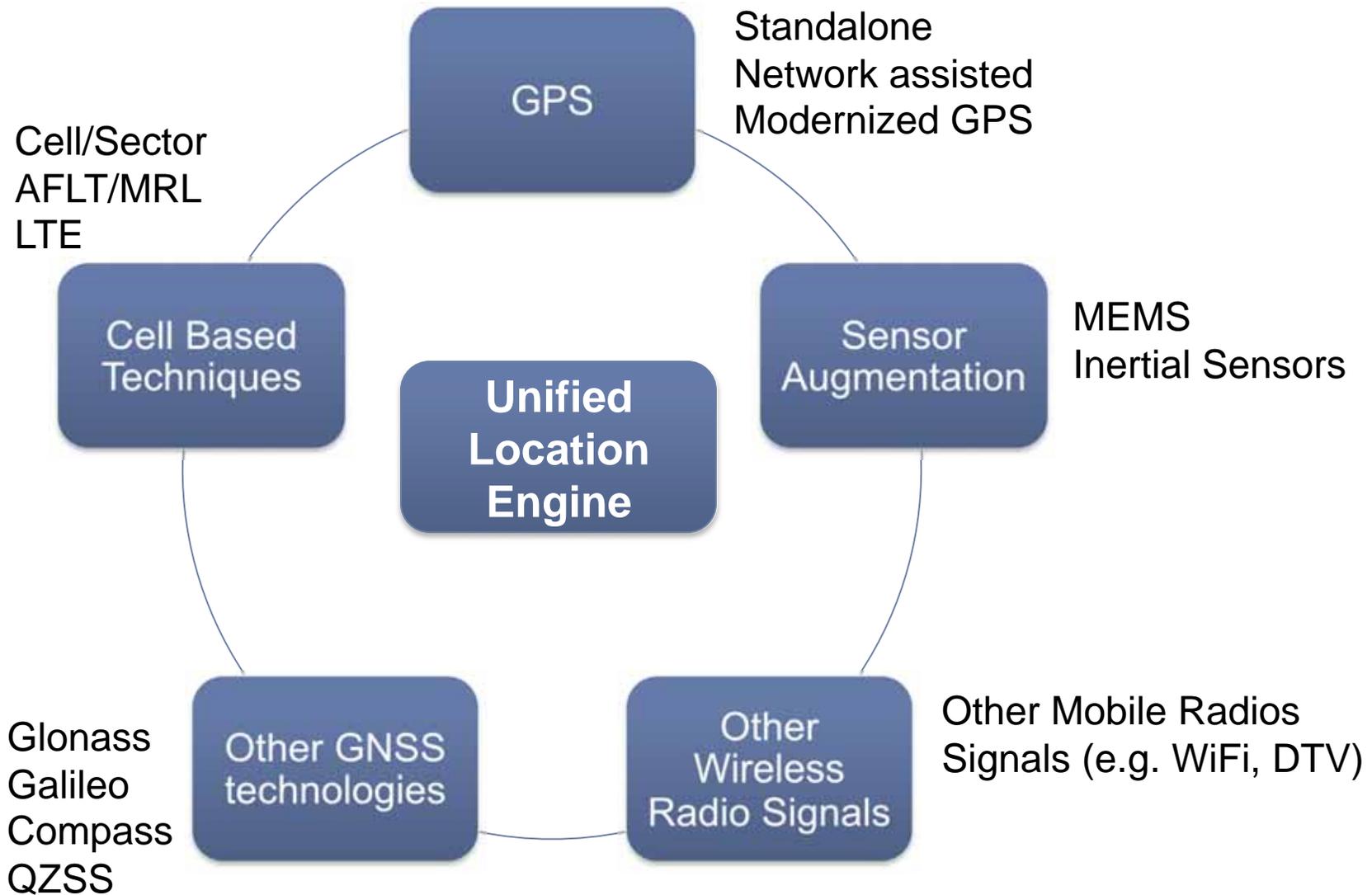
Phone Alert: A Starbucks
“coupon” is sent to your
phone (Bonus)!!!!

GNSS Deployment

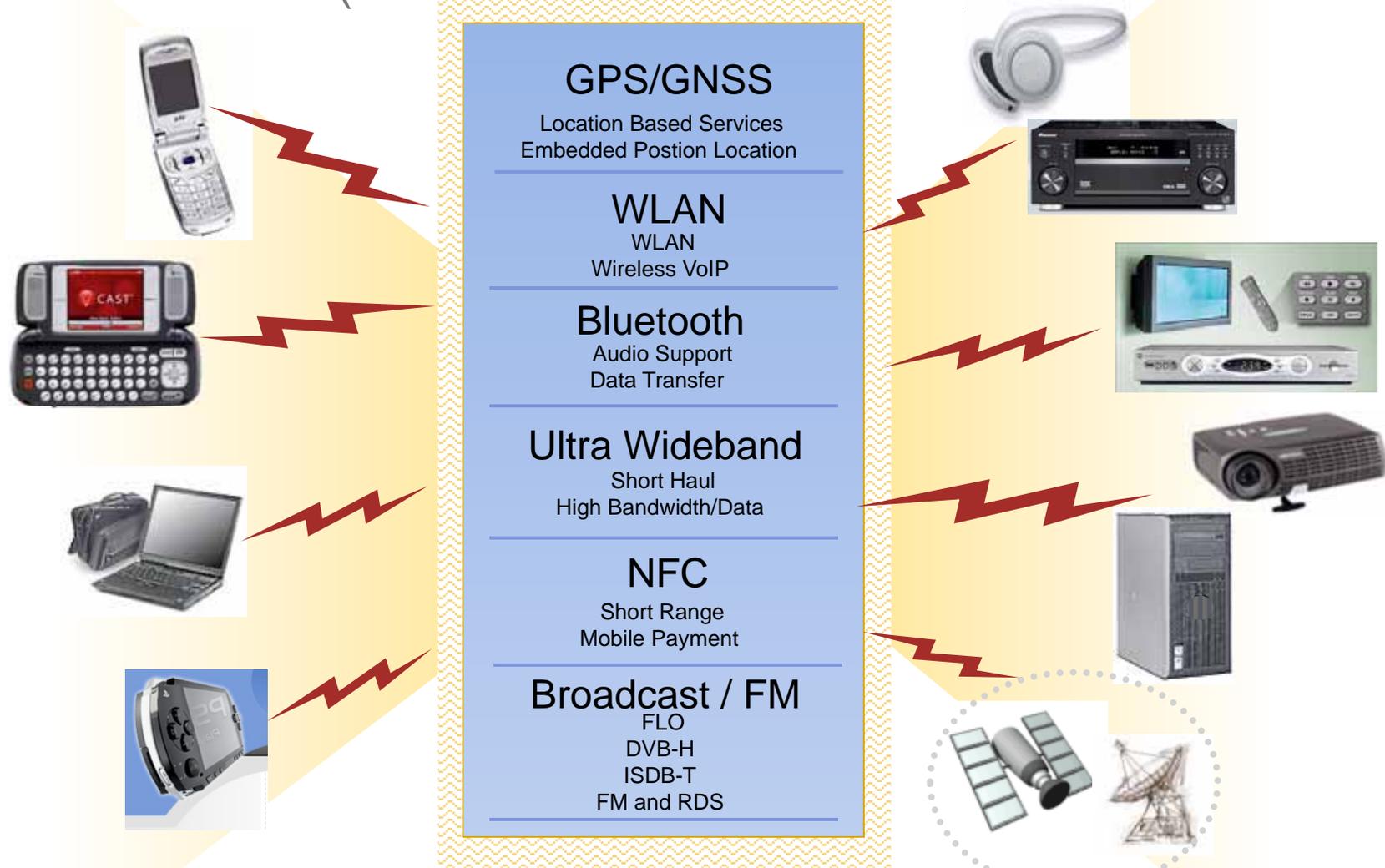
- GNSS is still fundamental building block for all location solutions
 - GPS (including Modernization), Galileo, Glonass, QZSS, Compass / Beidou...
- Implementation challenges are crucial
 - Multiple frequency RF
 - Internal jamming
 - Very low power consumption
- GNSS innovations
 - Still extremely important – for **both LBS and E-911**
 - Beginning to hit law of diminishing returns
- Harsh environment
 - GNSS denied scenarios
 - Right sensor mix is the real challenge



Use All Possible Sources to Deliver Location Experience

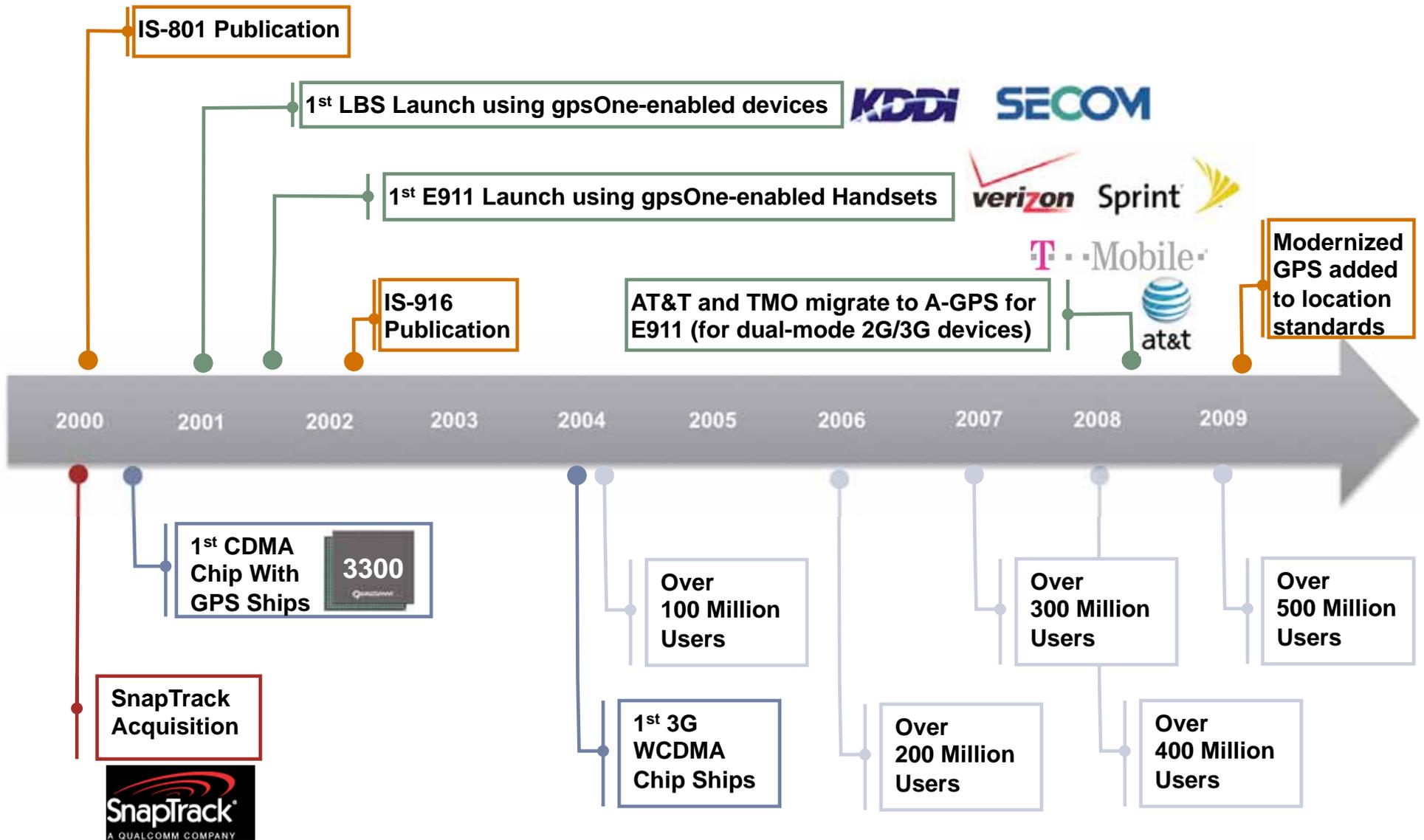


Multi-Radio Coexistence: Wireless Wide + Local + Personal Area Networks (WWAN + WLAN + WPAN)



Consumers Want it All! – Systematic Approach Needed to Coexistence – at All Levels – Big Challenges – Especially for RF

Evolution of Position Location on Mobile Devices



Location on Mobile Devices in the Future

Enhanced data through location and video and augmented reality

Seamless indoor tracking of friends/family and coupon alerts



Health data (blood pressure, pulse...) facilitated by GNSS/sensors



LOCATION

Autonomous driving alerts – “you are veering out of your lane”



Location-based “indoor ads” to your phone – “\$10 in free chips to gamble here”!



Indoor navigation with 1m accuracy, always on



Summary

- Position location is a central part of the mobile internet user experience
- Critical factors for the consumer as location-enabled Smartphones evolve
 - Accuracy
 - Time-to-**Location**
 - Ubiquitous availability
 - outdoors, in challenging environments (urban canyon), and **indoors**
 - Seamless service
 - car navigation to pedestrian modes, outdoor to indoor transitions
 - Concurrency with other multimedia applications (location as context)
 - GPS “Always on”
 - power consumption optimization

Qualcomm’s view: our industry be committed to delivering on a vision of
“Position/Location all-the-time everywhere”!



Maps



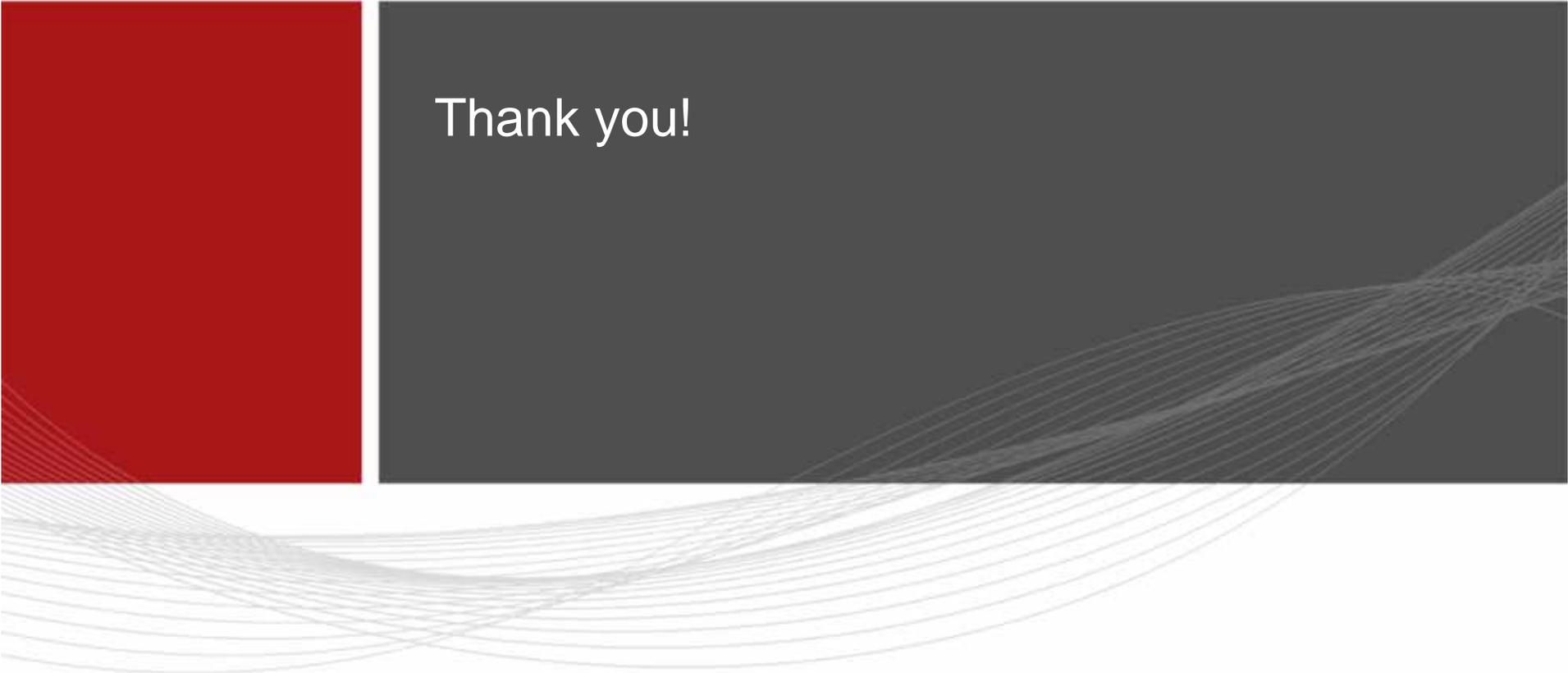
Traffic



Transportation
Schedule



POI/Local Search



Thank you!

'09 Snapdragon Powered Smarter Smartphones & Smartbooks

■ Industry Leading Performance

- Powerful superscalar 1GHz Applications Processor CPU
- 6th generation 600MHz DSP

■ Always On & Connected

- Low power consumption through custom CPU & DSP cores
- Ubiquitous connectivity with WWAN, Wi-Fi & Bluetooth

■ Advanced Multimedia & GPS

- HD video decode (720p)
- High resolution up to WXGA (1280x768) display support
- 3D graphics with up to 22M Triangles/sec & 133M 3D pixels/sec
- High performance multimode GPS – standalone and assisted



Location is a central aspect of the Smartphone mobile user experience

3G Subscriber Growth

>1 Billion 3G Subscribers Today



Note: *Forecast. Source: 3G Subscriber – Wireless Intelligence, 2/5/09