

CARTEC

Connected Vehicle Business and Operations Test Bed Cogenia Partners, LLC 9/2004

Contacts: Axel Fuchs axel@cogenia.com 408-333-9391
Scott Andrews scott@cogenia.com 650-472-1203

Imagine the Future

- Home, Office, Car and Person all working together to create a personal digital lifestyle
- Consumers configure their services at the PC and ASPs deliver them to their car
 - Flexible, high choice, service offerings
 - Every user's system is different
- Consumer's personal information is integrated with their car life
 - Home/Office PIM, and personal entertainment content
- Efficient execution of mobile commerce
 - Location oriented media and services
 - Entertainment and productivity media

Some Successful Examples

- DoCoMo i-Mode and i-Appli
 - User downloadable applications and services for phones
 - Every phone user has different suite of services and apps
 - Huge rapid growth of services and subscribers
- Web
 - High choice content and service delivery system, for PC users
 - Fostered un-planned creation and growth of numerous novel services, applications and content
 - Unprecedented growth and pervasiveness
- Key observations:
 - Application independent delivery platforms that support feature and function creativity and user choice exhibit high consumer satisfaction and high growth
 - Impossible to know in advance what will be popular. Need a system that does not care

The Problem

- Creating such a system is very costly and somewhat risky
 - i-Mode was created by the vision and pocket book of a single large telecomm (\$\$\$)
 - The web took decades to emerge from academia
- Long value chain is hard to organize
 - Value chain partners are unlikely to come together quickly by themselves
 - Too many competing solutions, too easy to get tangled in issues outside your business focus
- CARTEC is aimed at addressing this issue and creating the next generation connected car service delivery platform over the next 2 years

The CARTEC Solution

- Organize a project where value chain participants cooperate to create a reference implementation of an application-independent end-to-end service delivery system
- Realize the connected car vision without any single company taking on high risks or high costs
 - Limited risk, shared resources
- Eliminate system uncertainties that may hinder later deployment:
 - Security
 - Driving Safety
 - Certification of third party applications and services
 - Business models and billing mechanisms
- Create an application and content provider community that will deliver a variety of applications against clearly defined billing mechanisms
 - Let natural market selection lead us to the killer apps and viable business models
- Foster cooperation between stakeholders to create a connected vehicle economy that can quickly exploit growth of system

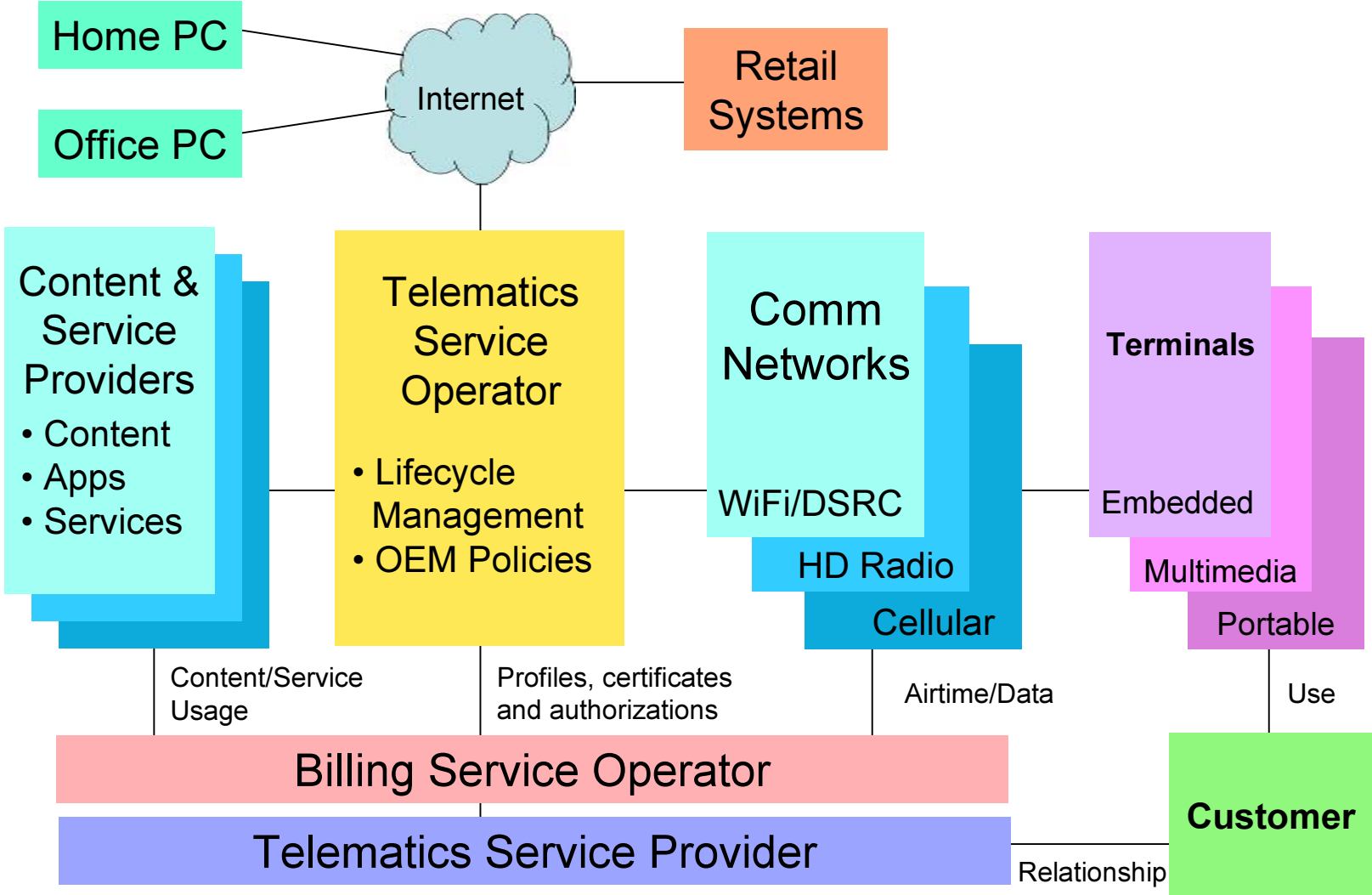
CARTEC Project Objectives

- Demonstrate real world implementation of dynamically provisioned end to end connected service system
 - Scalable, commercially deployable
 - Illustrate power and potential of this approach
- Create and manage a shared resource for developing ideas, testing implementations and showcasing products
 - Reduce cost and risk by spreading project effort over all stakeholders
 - Each participant brings their own products, and has access to the overall system
 - Participants can use test bed to highlight and refine their products in a real world operating situation
- Evolve test bed into next generation service delivery partnership
 - Provide improved product development focus and enhanced marketability of next generation connected vehicle products and services
 - Development and showcasing of products as “complete solution”

Basic CARTEC System Approach

- Separate services from communications and terminals
 - Multiple comm pipes, programmable terminals, numerous services
- Terminals can acquire different functionality on demand
 - Can add new apps as needed and as available
 - Can install applications in terminal to support proprietary back end services
- Use a flexible service management system
 - Remote install, configuration, and removal of applications
 - Enforcement of OEM policies, certifications, etc
- Provide support for multiple business models
 - Billing is a separate, changeable system element
 - Can implement many different business models by changing billing policies and logic

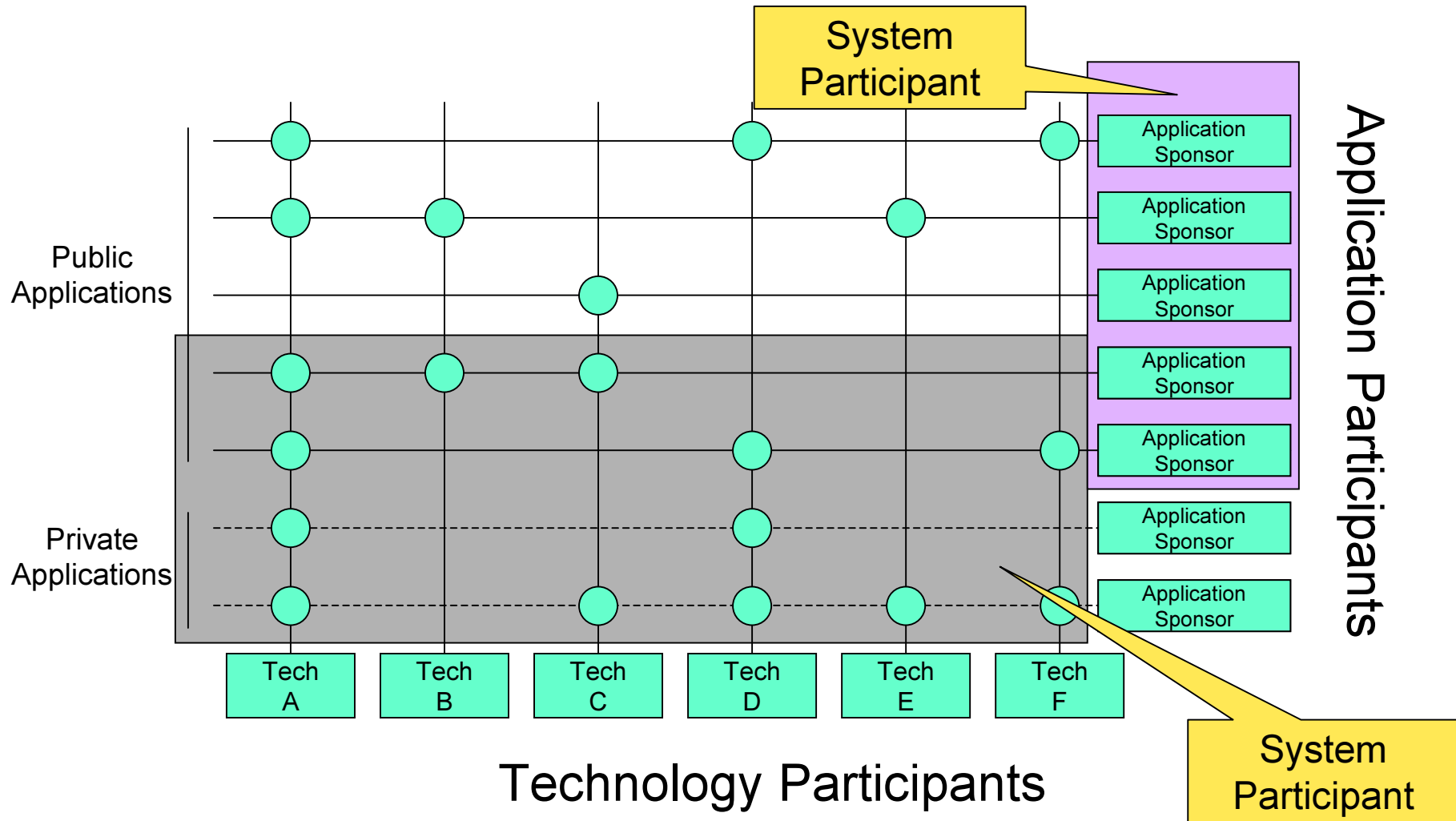
Overall CARTEC Architecture



CARTEC Project Structure

- Four types of participant
 - **System Participants** define overall architecture, guide project strategy, make broad use of system elements
 - **Technology Participants** bring a particular technical capability or service to the project
 - **Application Participants** make use of one or more (possibly several) technical capabilities to implement and demonstrate an application
 - **User Participants** use test bed to evaluate, refine and organize new vehicle service offerings, business models, etc. (primarily auto makers)

Technology/Applications Matrix



CARTEC Activities

- **Define** the architecture based on existing standards
- **Build** the test bed using existing systems
- **Organize** public projects to demonstrate value of architecture and implementation
- **Use** test bed to develop and refine private offerings
- **Evolve** test bed applications into real world opportunities

The Plan

- Finalize project participants
 - Jan 30, 2005
- Define Core functionality and initial public demonstrations
- Define architecture and write/adapt specifications
- Hold technical training workshops
- Implement interfaces and connect participant elements for first live operation
- Begin use and operation of the test bed
- Gather performance and operational performance data and develop refinements for system evolution

Current Status

- Current participants include:
 - 3 Car makers
 - 1 Large back end server system supplier
 - 1 Billing services provider
 - 2 Communications network providers
 - 2 Content providers
 - 2 ASPs
 - Several technology companies
- Additional needed participants:
 - More service and application providers
 - Terminal suppliers

Conclusion

- CARTEC project affords participants to opportunity to develop key competitive positions in the next generation of connected vehicle services
- CARTEC project allows participants to explore this space without extending their efforts outside their business interests
- CARTEC project allows participants to work directly with similarly interested participants to build commercial relationships quickly
- CARTEC provides an unfair advantage to participants to exploit this emerging opportunity

Appendix 1

Potential CARTEC Project: The Digital City

CARTEC Digital City Showcase

- Real world public demonstration of connected car services using CARTEC test bed
 - New consumer services
 - Public services (eg; traffic, tolling, etc)
 - Vehicle services (eg; maintenance and diagnostics)
- Provides exposure and public evaluation
- Helps drive definition and timing of CARTEC system architecture and applications
- Demonstratable at multiple events
 - Initial target is ITS World Congress 2005 (San Francisco, CA)
 - Can be expanded to other future sites (eg CES 2006)

Digital City Drives

- Digital City demo is comprised of four “Drives”
- Each Drive is intended to illustrate a range of applications to serve the needs of the Drive situation
 - Commuter
 - Cross Town Business Trip
 - Soccer Mom
 - Out of Town Tourist
- The Drives have some application overlap but this is presented in the context of the particular drive

Commuter Drive Applications

- Traffic Based Services
 - Running arrival time estimate based on traffic conditions
 - Recommended departure time on PC and/or text message based on traffic conditions
 - Text message reminding you to leave to make your meeting on time, given traffic conditions, and based on your calendar
 - Update of en-route incidents after departure with updated arrival time
- Download media content
 - Ex:Subscription based syndicated content, entertainment content, etc
- Download Call List
 - Download a list of contacts to make calls to during commute, including topics and numbers to be provided to phone
- Order/Pickup Food/Coffee
 - Pop-up query in car or on PC or phone: “Do you want to pick up coffee at ABC this morning?”
 - Press “Yes” and pre-set order is queued for ABC Coffee
 - When car is 5 minutes away, order is placed at ABC Coffee
 - On arrival at ABC, WiFi link alerts staff, authorizes payment
 - Staff brings your coffee out to the car
- Schedule Maintenance
 - Car alerts driver to upcoming maintenance need
 - Car sends notification message to user e-mail
 - At Home/Office, User selects “set Appointment” and system finds available appointments at service center and presents options. User selects desired time/date
 - System makes appointment and adds it to Outlook calendar

Cross-Town Business Trip Applications

- Download business trip info from Office/Home PC to car computer
 - Addresses from address book
 - Times from calendar
 - Phone numbers from address book
- Route support
 - Get traffic info
 - Determine best time to leave to make meeting
 - Send reminder text messages based on optimal departure time
 - Reserve parking in closest location
 - Set navi route to nearest parking location
 - Provide walking directions from parking to meeting
- Download Call List
 - Download a list of calls to make during commute, including topics and numbers to be provided to phone
- Update driving log
 - Present driver with selection screen to indicate personal or business trip
 - Upload log info to web accessible database for use in office/home
- Get Lunch/Gas
 - Select food retailer from list based on available time and traffic conditions (ie you have 10 minutes, so you get a list of close by fast food)
 - Get route guidance
 - Resent route to next meeting from food retailer

Family Vacation Applications

- Trip Planning on PC
 - Web based trip planning tool: clickable map with POI info and ability to set itinerary
 - Supports web based travel agency transactions and links them to the car
 - Download itinerary and content to car for trip
- Select and download media
 - Select Videos, albums, radio/TV shows, videos, etc
 - Send list to car
 - Car downloads current media at home or incrementally at WiFi hot spots
- Tour Guide
 - Download Audio “Tour Guide” at WiFi hot spot based on planned trip
 - Tour guide plays audio description of sights, historical points, etc, cued by navigation system location
- Get Gas
 - Locate nearby gas station of user’s choice (ad/brand based selection)
 - Route to station
 - Automatically pay for gas using WiFi link
 - Re-Route back to trip
- Get Food
 - Locate nearby food retailer of user’s choice (ad/brand based selection)
 - Provide menus in car to support decision
 - Route to selected retailer
 - Order in car from menu, place order when close by and automatically pay

Contact Information

- Scott Andrews
- Tel: 650-472-1203
- Email: scott@cogenia.com