



Intelligent Cross-Platform Connection Manager, built from the ground up,
for LTE and Hybrid Networks.

Spanidea Systems

Ideas to Implementation

UConnect - 4G Connection Manager

UConnect provides an intuitive interface to Discover, Configure, Control and Connect to LTE and Hybrid networks

- **Manage Network Connection** - Configure Client device, Search for best(prioritize) network, Connect and maintain connections
- **Manage connections in Hybrid Networks** – When LTE is rolled out, it will not replace 3G/2G, but augment it. So, a CM should maintain the connection as the LTE devices moves out of LTE coverage, and roll back to 3G/2G. Also supports **Wifi offloading**
- **Support for both Hosted and Host-less Modes** – Architecture offers the flexibility to run in both CPEs as well as user devices
- **Manage Multiple data connections**– Till 3G, once voice OR one data connections were possible from a device. With LTE, many connections with varying QoS may have to be actively managed over UConnect
- **Support “APN Aware” Applications** – Support apps that are built for 4G networks. UConnect will manage multiple secondary EPS bearer contexts

UConnect Architecture



Client



LIB/ Socket/ Service

Server



O
S
A
L

Server

Network Arbitrator

VPN

3G
Network
Manager

WiFi
Network
Manager

4G
Network
Manager

Tethering

DAL

3G



4G



UConnect Architecture

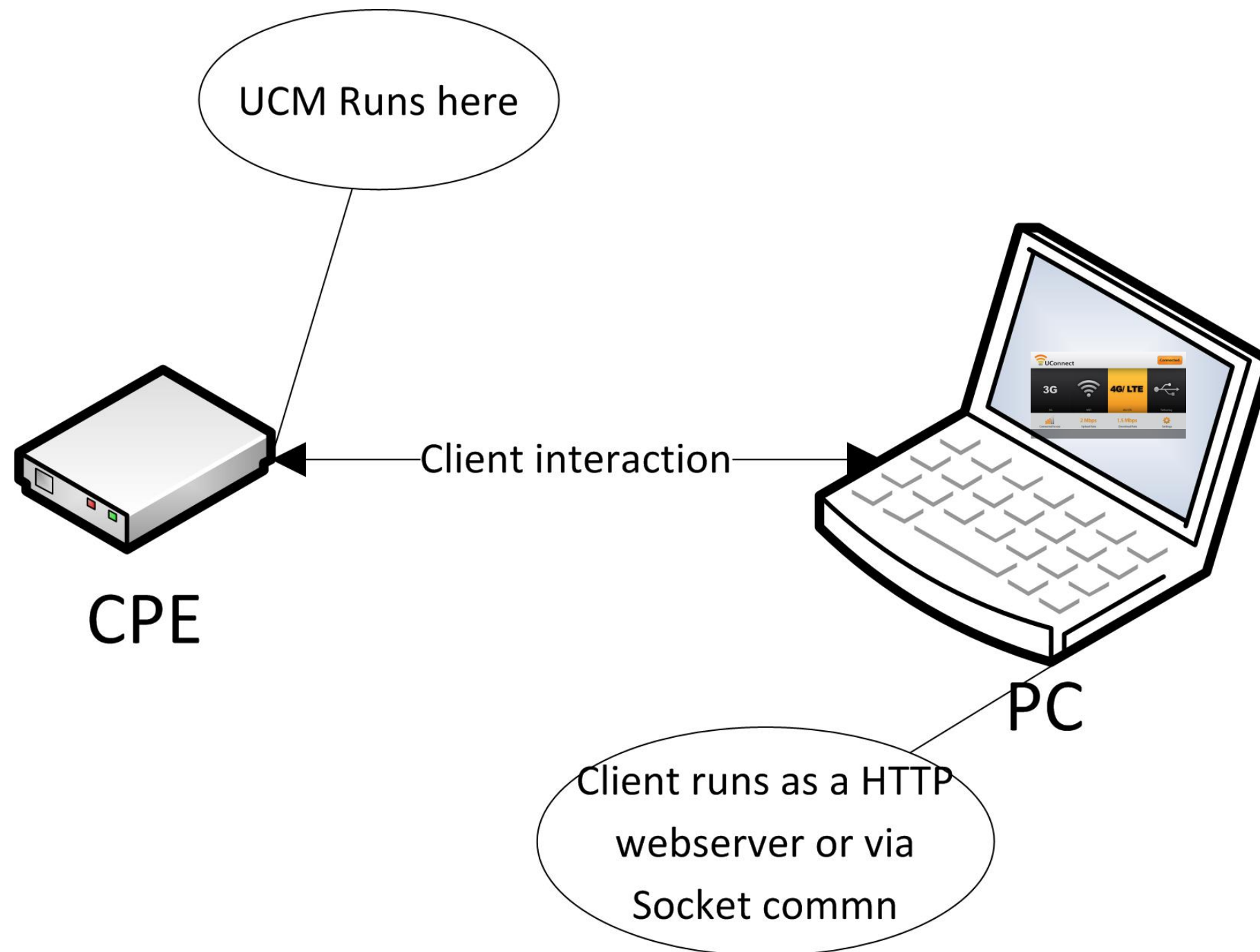


→ Client–Server Architecture:

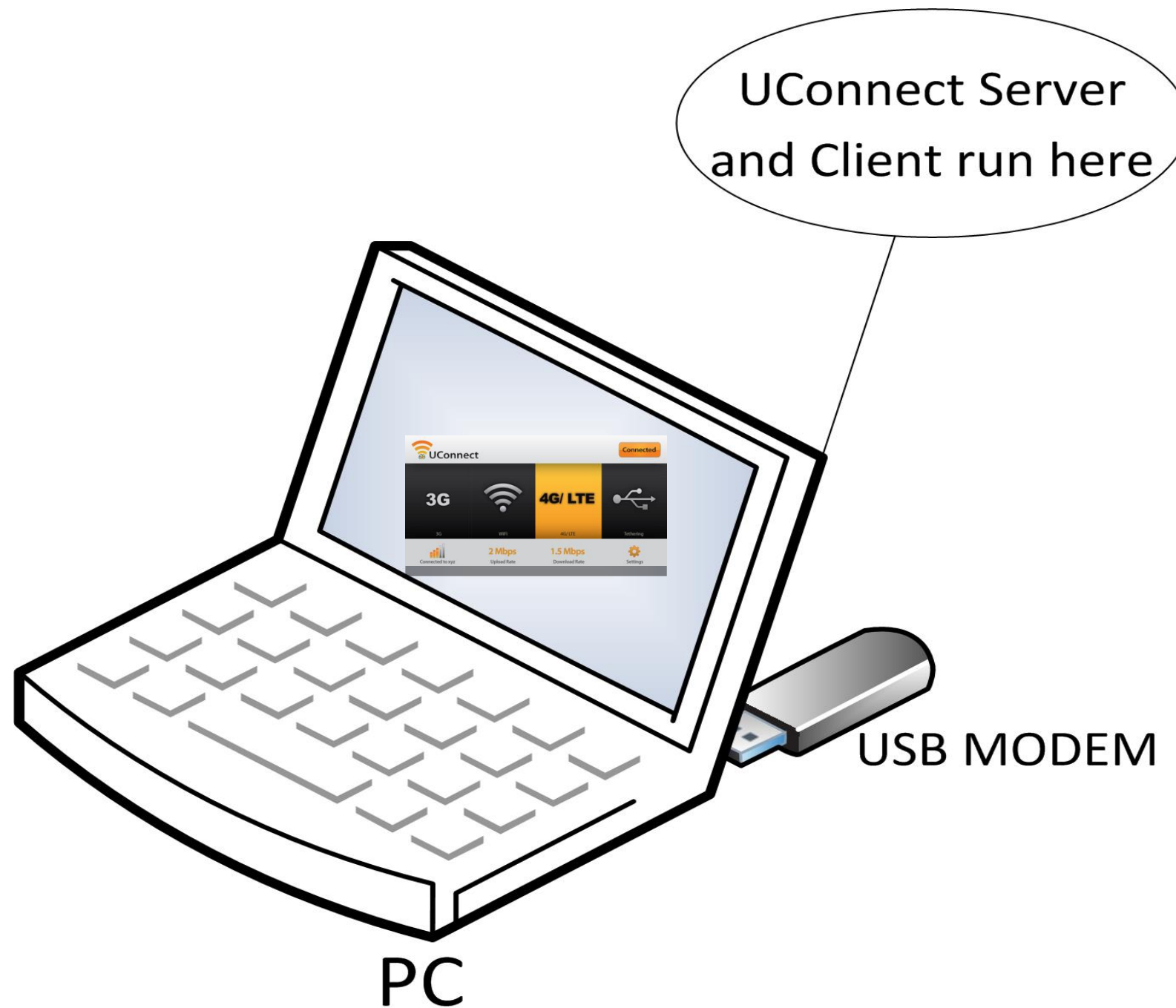
- Server performs the Network management operations on the modems. It can be built to run as a service on the OS.
- Client (GUI) has buttons, boxes and forms for user to enter data. Client could also be command line based for debugging. It is used to view the status of the connections and monitoring essential parameters
- Remote debugging is made possible by running the Server on a system which has access to the modem. Client can run on any other system and connect to server through sockets
- Logging can be done from either the Server or the Client. Log parameters are configurable too.



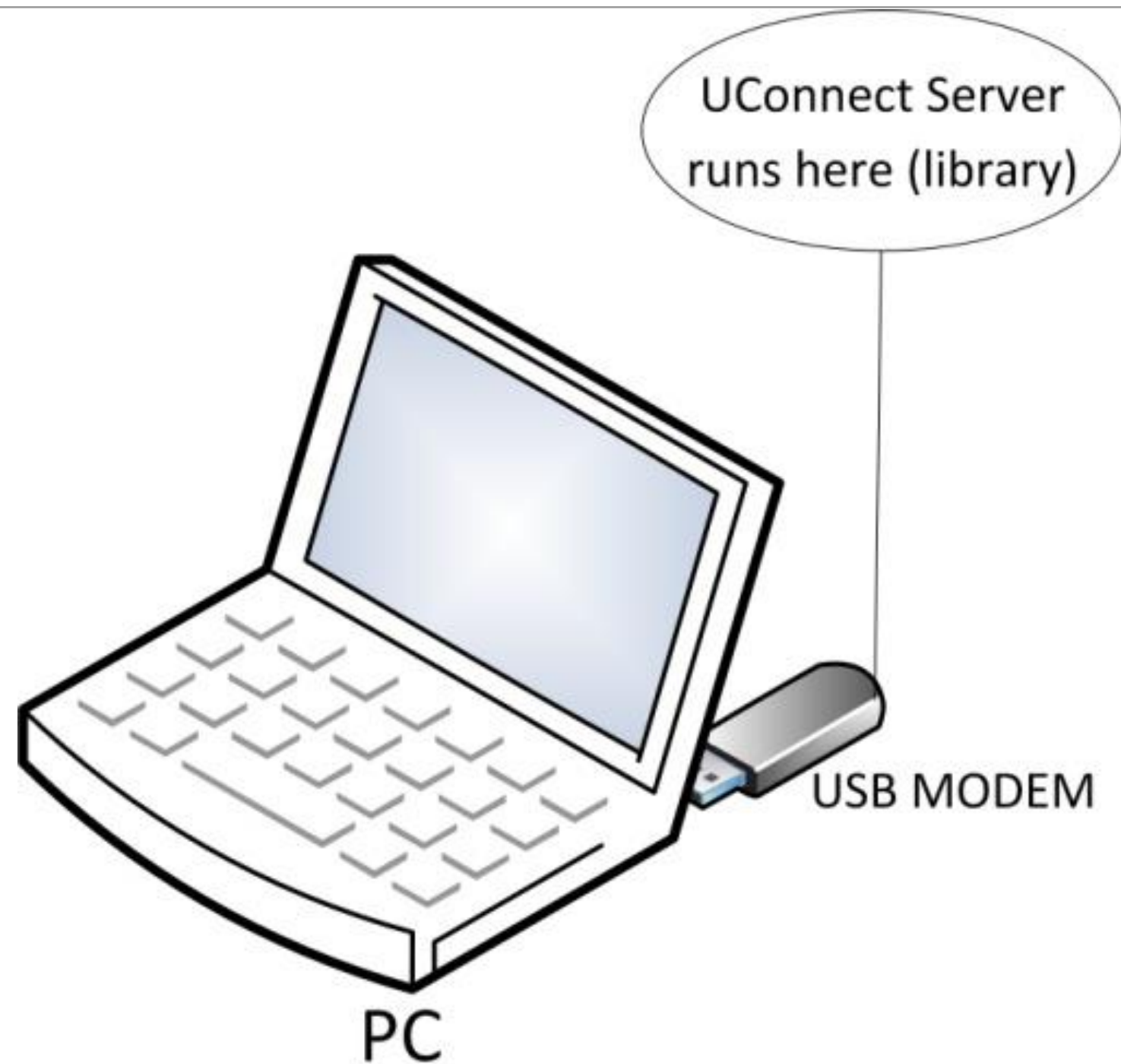
UConnect – Client Server Arch. Hostless Mode



UConnect – Client Server Arch. Hosted Mode



UConnect – Server as a library in the Modem



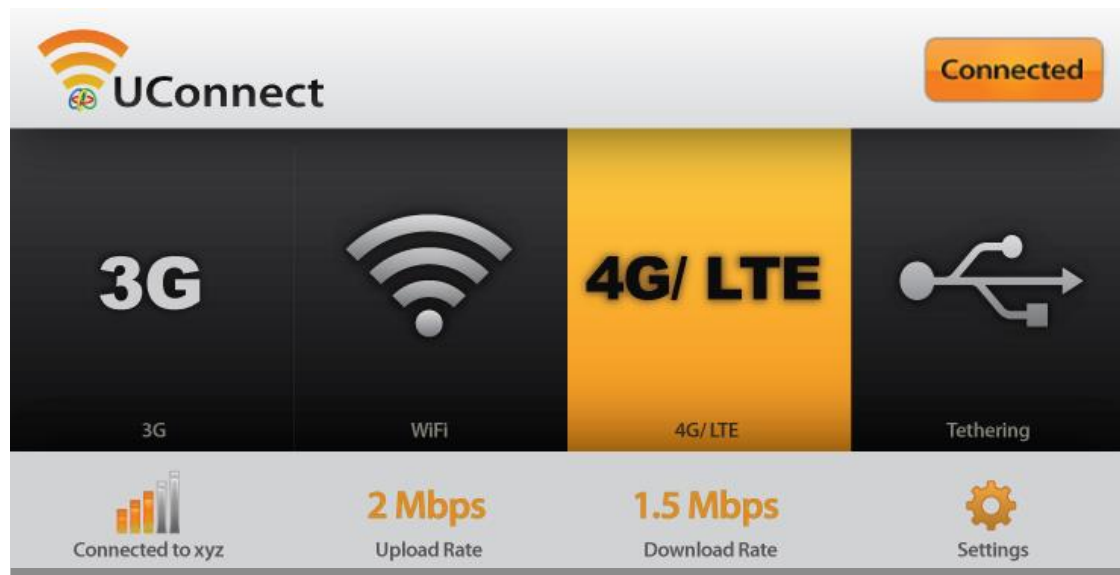
UConnect Architecture – Server Components



- **Network Arbitrator:** decides which network technology is active, based on parameters like the user's input, a handover from the network side, the best available network etc.
- **Network Managers :** Controllers for a particular technology (3G, 4G, WiFi). Comprises of a State machine, DAL (Device Abstraction Layer) for the corresponding technology
- **DAL :** Device Abstraction Layer abstracts the device driver API calls, making UConnect operable with different modems. This layer would send AT commands to the modem, where applicable
- **OSAL :** Operating System Abstraction Layer abstracts the OS specific calls for thread creation, task creation, message queues, semaphore locks. This makes UConnect easily portable on different OSes.



Consistent User Experience Across Devices / Platforms



- ✓ *Whatever* be the platform of the choice of the user, irrespective of the device **form-factor** (USB Dongle, Embedded LTE etc) the user gets the SAME consistent user experience
- ✓ This greatly improves end-user experience, and positioning of the brand



Unified Billing / Accounts



- ✓ All users can have a single window to access their accounts / bills
- ✓ UConnect can also be customized to manage multiple devices based on a single username / password
- ✓ USSD support for prepaid accounts



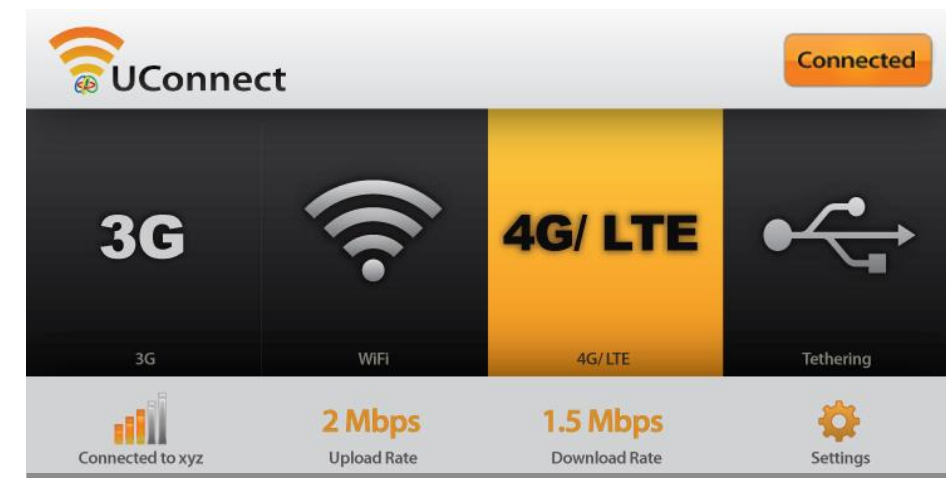
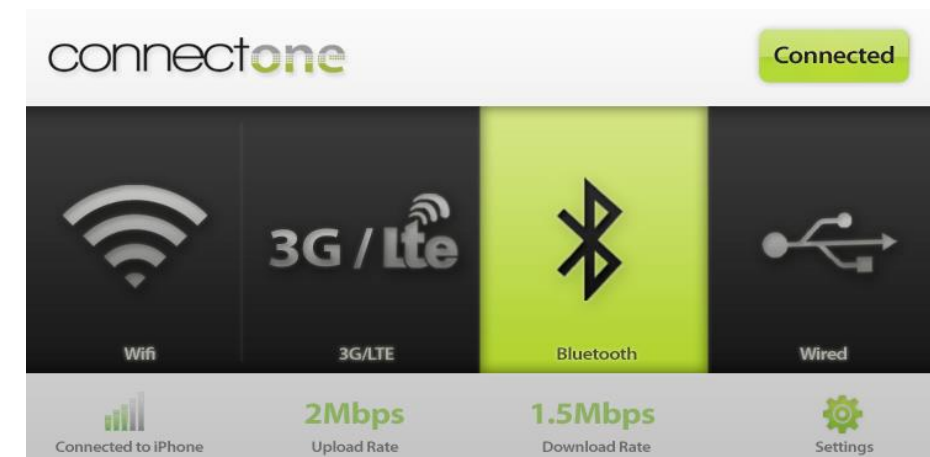
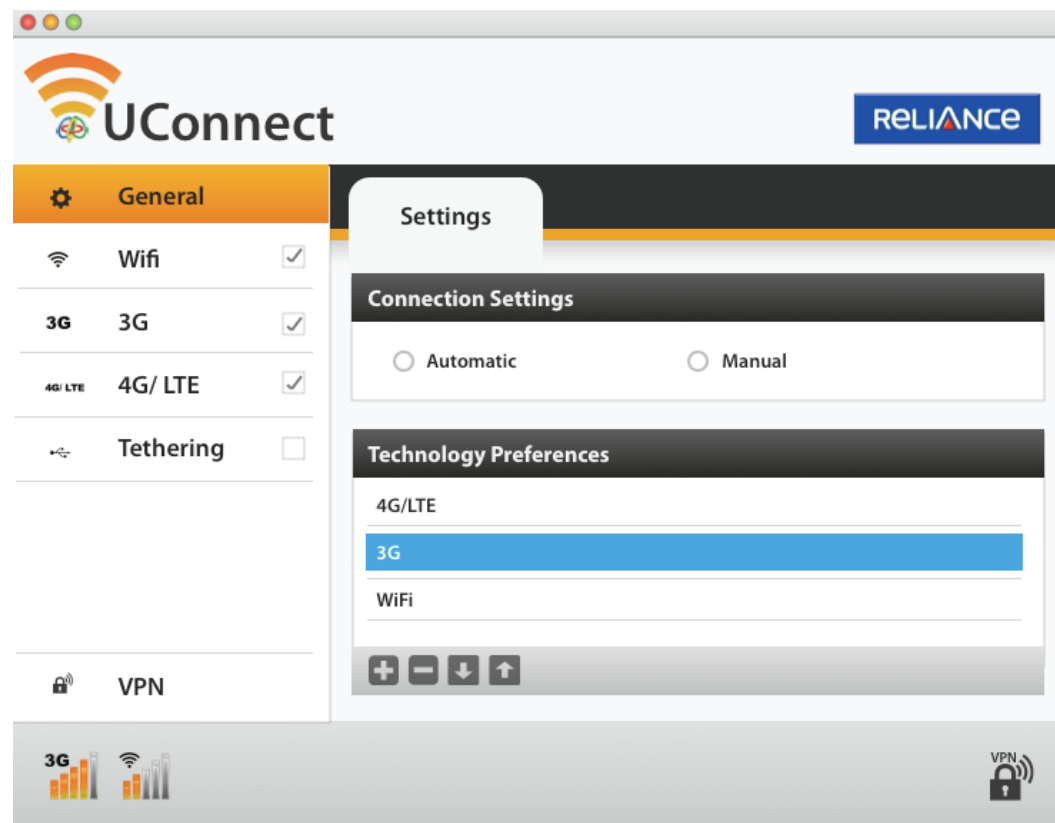
Wireless Expertise (4G/LTE, 3G, WiFi)



- ✓ UConnect is built by a team with a vast experience in 4G/LTE and other Wireless Technologies.
- ✓ Combined experience of over 60 years in the wireless domain
- ✓ Extremely sound and stable product with well-thought out features



Customizations

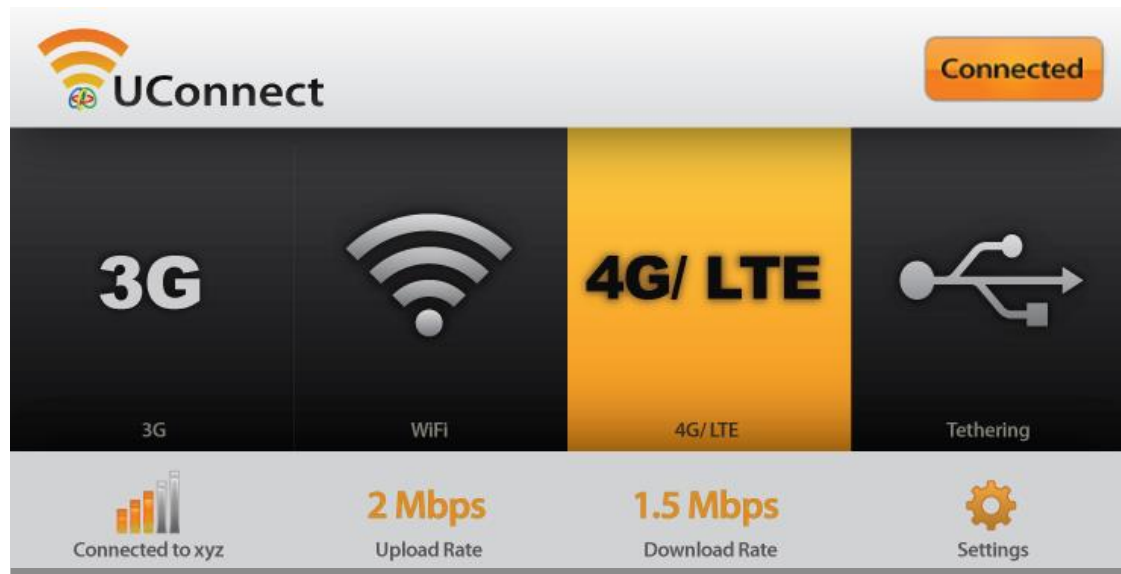


- ✓ UConnect can be customized for a wide range of
 - ✓ UI
 - ✓ Devices
 - ✓ Chipsets
- ✓ Our Architecture is **built from the ground up** for customizations (DAL)
- ✓ Skinnable (for UI)



Enhanced View for Field Tuning and Diagnostics

Remote Diagnostics Feature for PC OEMs

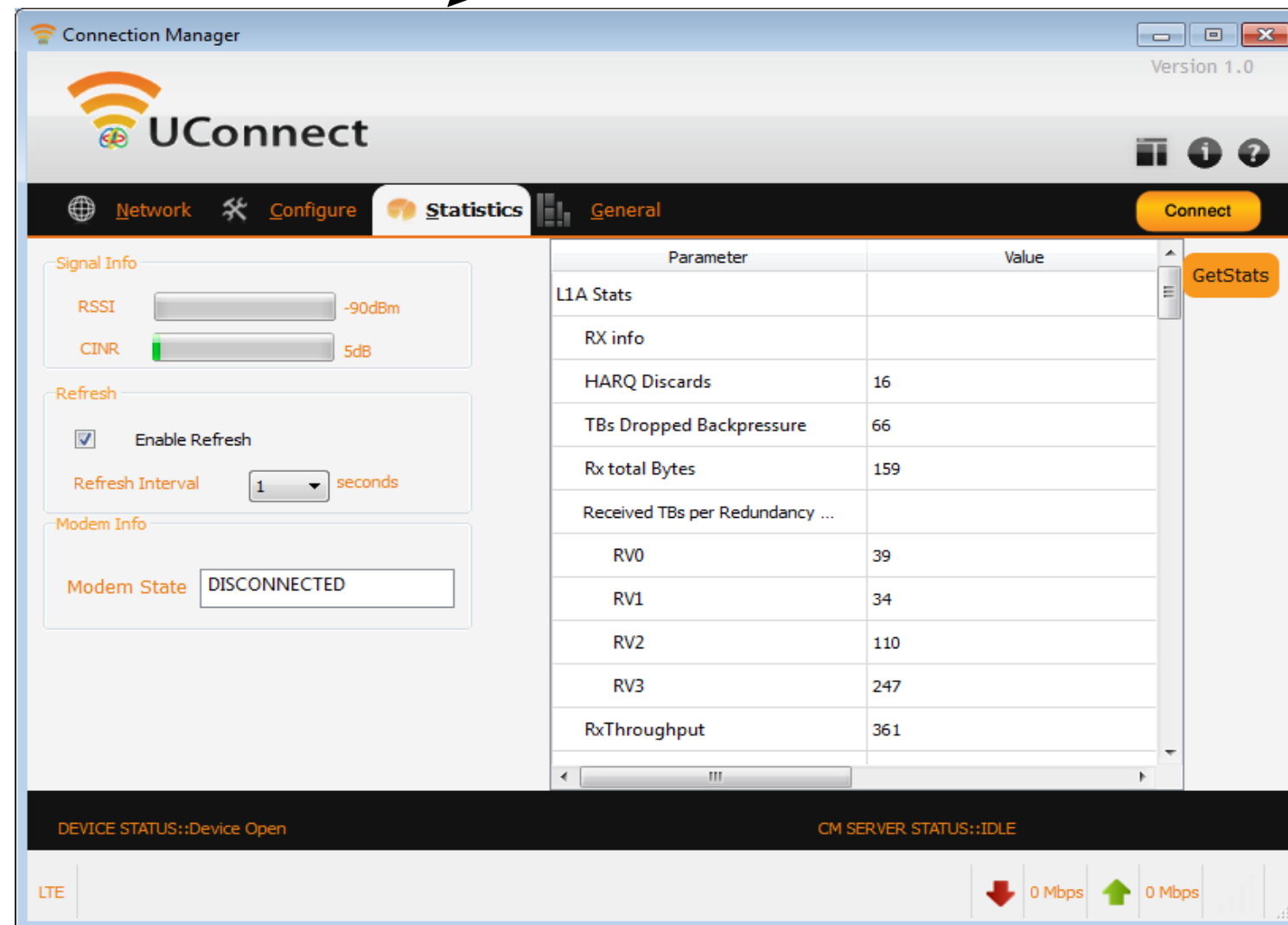


General View

Detailed View

A Diagnostic view with detailed statistics and diagnostic information

- Get all the information and pinpoint the exact issue
- Great for quick debug on the field during deployments
- Remotely collect information to debug field issues



Options for Licensing



- ✓ UConnect is available for licensing with a variety of business models





UConnect – Unique Advantages



UConnect – Integrated Device Management



- ✓ UConnect comes with Integrated Device Management Module (UManage) that is OMA DM based
- ✓ Apart from regular DM features, it also features 'Anti Theft' features:
 - ✓ Locate My Phone
 - ✓ Remote Wipe / Lock
 - ✓ Sound Alarm etc.
- ✓ It can be bundled with UConnect-WiFi HotSpot Management Program for phones / tablets and Laptops



Uconnect – Distinguishing Features



- **VPN** : Virtual Private Network enables the user to connect to a private network through the internet. UConnect enables the user to have a VPN connection running over any of the network technologies supported
- **Tethering** : Interacts with the tethering client on the device to enable one device to share the internet connection of another device. A one-touch tethering solution is offered by UConnect
- **IMS Support** : IP Multimedia Subsystem support for voice and data call continuity is a feature offered by many network technologies today. UConnect integrates IMS features for technologies that support them.
- **RAS Profile Management** : Remote Server Access dialing is a feature that is needed on many commercially available modems to setup an internet connection. UConnect helps the user to create, modify and dial RAS connections with a few clicks



Uconnect – Distinguishing Features



- **EAP SIM and EAP AKA:** Uconnect incorporates these authentication protocol thus allowing Wlan users to authenticate access to Wlan networks using a mobile phone SIM/USIM card.
- **Integrated Device Management (OMA DM):** Uconnects is integrated with a Device Manager based on OMA DM (Version 1.2.1).
- **Data for Network Operators:** UConnect can be configured for Reporting field data for analyzing, tuning and diagnostics by network operators.
- **Tracking Data Usage and Roaming Alerts:** Uconnect can track data usage and roaming, so that the user is well informed regarding the real time usage.
- **Support of SMS, USSD and Phone book features**
- **IWLAN/Mobile IP?? ANDSF??**



UConnect – Developer Engagement Program



- ✓ As demonstrated in the Phone / Tablet ecosystem, Apps are the key to winning the market share
- ✓ UMA understands this, and is exposing a lot of important features as APIs that are compliant with OMA CM API recommendation to developers
- ✓ With this, developers around the world can use the APIs to enhance their programs or provide unique apps that leverage advanced features of UConnect and LTE. We are in the process of releasing these APIs, and Beta program will be released soon





UConnect – Customers / Partners



UMA's Customers / Partners

The Proven Solution!



- ✓ We are also working with a lot of other Network Operators / ODMs / OEMs / Laptop / Phone / Tablet Manufacturers around the World to make UConnect the chosen platform for Connectivity and Device Management





UConnect – Technology Advantages



UConnect vs Default Connection Managers



- ✓ **Unified Connection Management:** One Connection Manager for All Interfaces
- ✓ **Customizable Connectivity / Priority Setting:** Ability to choose the technology based on OEM / User / Operator defined priorities, Location, Channel Quality or any other OEM Requirement
- ✓ **Optimized Mobile Experience:** Support for Mobile User (Hooks for IP Mobility Agent, Session Continuity etc.)
- ✓ **Monitored Data Usage:** Exhaustive feedback to user on how the data connections are utilized



UConnect – Value for ODMs



- ✓ **WiFi Offloading:** A user can use the same Connection Manager to offload data to WiFi hotspots (right now, or in near future). The experience could be seamless because UConnect can use EAP-SIM to authenticate the user to the WiFi hotspot
- ✓ **Point of Deliver for various Services:** Connection Managers have ceased to be simple software that connect a device to a network. They have become the entry point for the operators to provide services to the customers. All the devices in their network are integrated with the same connection manager to enhance user experience and also provide a range of services
- ✓ **Enable Applications to use Advanced Features of LTE:** By using UConnect's Connection Management platform, applications can access the advanced features of LTE in laptops / PCs and CPE routers, embedded devices and mobile phones / tablets. UConnect will soon be released with a OMA CMAPI (Connection Management API) compliant software API.
- ✓ **Reduce Device on-boarding time:** A lot of time is used in validating each network to connect to the network. If the ODMs integrate all the devices to one / two standard connection management providers, it would greatly reduce the time it takes for each device to get validated in the network. As a direct result, more devices can work in your ecosystem



UConnect – Value for ODMs



- ✓ UConnect is **pre-integrated with three of leading semiconductor vendors**, and we are adding support for more silicon vendors. Since integration and testing is already done, it helps the OEMs to quickly hit the road with their devices, significantly reducing the Time-to-market
- ✓ As UConnect is deeply integrated and validated with the chipsets, we **can leverage the entire gamut of features exposed by the silicon vendors** through proprietary AT commands/ APIs (not just the generic AT Commands that are exposed by various vendors)
- ✓ We are setting up a dedicated team for supporting OEMs that license UConnect – We'll be a **one stop shop for integrating UConnect with their devices**
- ✓ Support for **multiple form factors** (CPE, Dongles, embedded...) and **multiple operating systems** (Windows, Linux, Mac OS X, Google Android) - Enables easy and faster rollout of new products.
- ✓ We are continuously evolving the product to add new and exciting features by investing in R&D (UConnect customers always stay ahead on the technology front)
- ✓ Highly Customizable to include Operator branding and **multiple licensing options**



UConnect – Value for **Your Customers**



- ✓ *Consistent User Experience across Platforms and Devices*
- ✓ *Unified Billing Screen (with Support for USSD)*
- ✓ *Potential Integration for Multiple Devices of the same user*
- ✓ *Access to Various Services from Operators*
- ✓ *Manage, Upgrade, Maintain – Devices and Accounts*
- ✓ *Cloud Storage Integration with Kepplr*

A Single Unified Platform for Users to Manage their Services



Awards & Recognitions



- Best Product Startup, India (Winner – TechSparks, 2011) – Also, featured in **Tech30**, a report compiled by **YourStory.in** which lists Top 30 most promising Startups in India [Jury comprising of Google, Amazon, IBM, Sequoia Capital, National Instruments]
- **Top #8 : QPrize 2010** (by Qualcomm Ventures) from 125 startups participating from India
- **Microsoft Bizspark – India Startup Challenge 2011** – Top #15
- Awarded the **Best Startup in Mobile / Internet Category** in **‘Startup City, Bangalore - 2011’**
- **Top #15 : Marico Innovation Awards, 2012** – report From 474 companies that applied for the Award
- **Top #10 : Mobile Technology Companies in India**, By Smart Techie, [For two consecutive years - 2011, 2012]



Glossary



LTE	-	Long Term Evolution
APN	-	Access Point Name
CM	-	Connection Manager
CPE	-	Consumer Premise Equipment
QoS	-	Quality of Service
3G	-	Third Generation Mobile Technology
4G	-	Fourth Generation Mobile Technology
IMS	-	Internet multimedia Subsystem
SMS	-	Short Message Service
USSD	-	Unstructured Supplementary Service Data
VPN	-	Virtual Private Network
LBS	-	Location Based Service
PLMN	-	Public Land Mobile Network
DAL	-	Device Abstraction Layer
OSAL	-	Operating System Abstraction Layer
CLI	-	Command Line Interface
mVAS	-	Mobile Value Added Service
GUI	-	Graphical User Interface
MMS	-	Multimedia Messaging Service
OEM	-	Original Equipment Manufacturer
API	-	Application Program Interface
AT	-	Modem Attention Commands



