A Scalable Small Cell System as a Services Platform inside the Enterprise

Made for Mobile Operators for LAN Deployments Inside Large Enterprise Customers & Big Venues

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SpiderCloud Wireless
Scalable Small Cell Systems for Mobile Operators to Address Enterprises & Venues with Coverage, Capacity & Managed Mobility Services

- Based in Silicon Valley (USA)
- Management team with proven RAN & enterprise success
- Customers: Mobile Operators such as Vodafone UK, Netherlands & more
- 2 Years Competitive Head Start w/Scalable 3G Deployments
- Started shipping dual-band 3G/4G and 4G/4G Radio Nodes June ‘14
- Why SpiderCloud? Scale, Speed, Cost and Simplicity
  - Enable a mobile enterprise inside
  - Time to revenue
  - New Services
We Make Scalable Small Cell Systems

One System of 1 Services Node and 100 PoE-powered Radio Nodes Can Scale to Cover 1.5 Million Square Feet
First Commercially Available Dual-Mode 3G/LTE Small Cell

SCRN-310: Concurrent 3G and LTE Radio Access

- **3G Radio**
  - 32 3G channels
  - 21 Mbps HSPA+
  - 250 mw peak transmit, receive diversity

- **LTE Radio**
  - 32 active LTE users
  - 150 Mbps LTE
  - 2x2 MIMO with 250 mW peak transmit power
  - Single Ethernet cable, Power and Data over Ethernet
  - > 99% accessibility and <0.5% dropped calls in scalable deployments

- Each Radio Node is a full 3G (or 3G and LTE or LTE+LTE) cell, not just a radio head
- Deployed over Enterprise Ethernet LAN
- RN operating at 250 mw covers ~ 15,000 ft$^2$
- Single Services Node supports up to 100 RNs; systems can serve building as large as 1.5 million ft$^2$
Small Company, Big Achievements

- **June ’14** - First to commercially ship LTE/3G scalable small cell systems
- **Feb ’14** - Intel, IBM, and HP showcase services using SpiderCloud’s small cell platform
- **Feb ’14** - First to enable operators to make use of a smartphone app to simplify small cell sales process
- **Feb ’14** - Vodafone UK announces Sure Signal Premium using SpiderCloud’s systems
- **Nov ’13** - First to bring to market a dual-band 3G/LTE Radio Node on an integrated SoC
- **Sep ’13** - Vodafone Netherlands announces deployments of SpiderCloud’s systems
- **Feb ’13** - First to virtualize several enterprise services on a scalable small cell platform
- **Oct ’12** - First to offer a multi-mode access system with 3G, LTE/4G and dual-band Wi-Fi
- **Jun ’12** - NEC signs worldwide reseller agreement with SpiderCloud Wireless
- **Apr ’12** - $35 Million investment
- **Feb ’12** - First to include Wi-Fi in scalable small cell system
- **Dec ’11** - First commercial 3G deployment (UK): scalable small cell system w/seamless handoff + SON
- **Nov ’10** - Patent for soft handoff for scalable small cell system
- **Nov ’09** - Announced Industry’s first controller/services-based small cell platform for enterprise market
- **Dec ’07** - Company founded and created to build networks inside-out

**Patents:**
- Handoff
- SON
- Scheduling
- LBS Data Collection
& More
Market Opportunity
Over 70% of Mobile Data Usage is Indoors

Users expect seamless experience – outdoor & indoor
In-building Capacity Essential to Win Enterprise Customers
Over 60% of Subscribers Are in Buildings Larger than 25,000 ft²

# Subscribers is proportional to floor space, not # of buildings
10% of buildings are larger than 25,000 ft² and represent >60% of floor space
Operators Want to Win Major Enterprise Accounts

Enterprise customers constitute 15% of subscribers, 30% of revenues

Enterprise (B2B) Sales Teams at Service Providers Want to Win Fortune 500 Companies, Financial Institutions and Government
Enterprise IT Willing to Switch & Pay More for Reliable In-Building Mobile Services

UC and MDM as hosted services are the most hotly in demand from enterprises: 29% of businesses are willing to pay between $1 and $19 per employee per month for hosted UC; 20% would sign up for hosted MDM.

66% of US IT managers would pay up to 30% more for better indoor wireless coverage.

92% of US IT managers would pay over 30% more for better indoor wireless coverage and managed services.

Source: iGR Jan’14

The iGR survey results support YouGov findings from 2013 where 47% of decision makers surveyed in Britain said they would be interested in mobile device management as an operator service. This leaps to 78 and 77% for Germany and Spain and a massive 89% in the US.
Enterprise Challenges and Solutions
You Have to Overcome the “Hidden” Enterprise Challenges Ahead of Time

1. Security & Policy
   - Co-mingling of operator’s IP traffic

2. Cabling: Use Existing or New
   - What if the risers are at capacity?

3. Additional infrastructure
   - Forklift upgrade funding source?
   - Does operator cover all costs?

4. System Integration
   - Multi-vendor landscape
   - Planning & implementation of major network changes

5. System scaling
   - What if another 10 floors are leased?
E-RAN Enterprise Deployment

Active LAN, RF, and Baseband Components*

SpiderCloud Small Cells (RNs)

Category 5+ UTP Cabling (Ethernet Access)

Cat 5+ UTP or Fiber Cabling (Ethernet Backbone Riser)

Power-Over-Ethernet LAN Switches (100/1000)

SpiderCloud Controller (SN)

*Each RN is a full nodeB/eNodeB

Low Cost, easy-to-install LAN equipment & cabling

Low Cost Baseband Equipment

Additional Coverage & Capacity
Services Node Solves Challenging Interference, RF and Deployment Challenges

- 3-dimensional RF interference
- Flat fading
- Rapidly changing channel
- Reliable voice handovers difficult
- SON is critical
3-D Small Cell SON

Visualization Map
SpiderCloud’s SON for Scalable Small Cell Systems
Planning & Deployment Models
Time-To-Market Advantage with SpiderCloud

Indoor system in exchange for subscribers

Negotiations with IT department & building landlord

System planning & design

System install, testing & acceptance

System live

< 1 month
Live Networks in 30 Days with “EASY-30”

**Ethernet**  
(PoE & VLAN)

**SON**  
(Self-Organize, Self-Optimize)

**App**  
E-RAN Pre-Sales Estimate

**Yes**  
(buy-in from Customer and Mobile Operator)
“EASY” Enables A Rapid Deployment Plan
Enterprise Deployment Experience
Large Service Agency w/Multiple Buildings

Solution
- Services Node installed in Data Center to serve all three sites
- 68 Radio Nodes installed in the sites
- Utilized LAN/VLAN and MAN Architecture to support installation
- E-RAN flexibility overcame Communications Room space issues

Results
- A Very Happy Customer
  - Immediate improvement in services levels and customer satisfaction
  - 2,800 Voice + 175,000 data sessions per day
Government Organization

Solution

- E-RAN utilized existing LAN/VLAN Architecture to speed up installation
- E-RAN system with 49 Radio Nodes installed within a week
- Approved (secured) contractors performed installation

Results

- A Happy E-RAN enabled Customer
  - Excellent coverage throughout. From “No signal” to “5 bar” coverage
  - Zero disruption to operations and infrastructure
  - 1,000 Voice calls per day
  - 40,000+ data sessions per day
Large Global Financial Institution

Solution

- Services Node installed in Telecoms Center to serve site
- 65 Radio Nodes installed in the site
- Utilizing separate enterprise LAN Architecture to support installation
- Onsite installation completed in 4 days

Results

- Happy Customer
  - Excellent 3G coverage throughout building
  - Offloads 100’s of Gigabytes per month of data from macro network
  - 1,700 Voice calls + 287,000 Data sessions per day

1 Services Node
3,000+ Subscribers
16 Floors
65 Radio Nodes
Beyond Coverage & Capacity:
Small Cell Services
Communication Service Provider Challenges
Create New Business Opportunities and Improve Subscriber Experience

Network Transformation with Virtualized Services at the Mobile Edge

Where Enterprise Networks Meets Service Provider Networks
SpiderCloud Enables New Enterprise Services with a Small Cell System that Can Scale to 1.5M Sq. Feet

- Recognizes when devices enter & leave the building
- Track devices & assets within the building
- Monitor use of a building and reacting to it
- Context for delivering content & services
- Devices securely identifies

Available Modules
- 3G
- LTE
- Applications and Services

Opening Up a $100 Billion Market Opportunity for Mobile Operators by 2020
The Services Node is a Platform for Managed Services

SN includes a Services Module
- x86 based
- Hosts 3rd Party VMs
- APIs to access voice, data, intelligence

Use cases (developed with partners)
- Indoor Location Services
- Mobile Unified Communications
- Content Acceleration
- Usage Analytics
SpiderCloud’s Services Node (SCSN) provides a trusted connection to the Radio Nodes and a logical view into all devices on the E-RAN, to enable secure services to any mobile device on the network. The SCSN enables mobile operator managed cloud and application services, such as MDM, BYOD, location and context-aware, security, and IP-PBX services. The SCSN includes a services module that includes a 64-bit Intel Xeon processor that uses Intel Quick Assist Technology and a 120GB solid-state HDD, offering a virtualized environment for a wide range of applications.

The Intel Quad-Core Xeon Processor is the basis for the services module which enables us to host virtual machines on the Services Node. With Intel, SpiderCloud has established several services partners to showcase how managed services are enabled via the Services Node, after a small cell system has been installed.

Context Aware Applications development projects with mobile operators. SpiderCloud, HP and Vodafone UK won a Small Cell Forum award in June 2014 for innovative work in this area.

Location and detection. Using a virtual machine hosted on the Services Node, IBM can demonstrate handset-to-location video and advertising “push” services for use at venues and shopping malls.
We Make Scalable Small Cell Systems

One System of 1 Services Node and 100 PoE-powered Radio Nodes
Can Scale to Cover 1.5 Million Square Feet

Services Node
(1U in the enterprise data center)
SpiderCloud Wireless
Awards & Nominations

Dual Band 3G/4G Radio Node

Intel Edge Cloud NFV

2014 Private Company of the Year
Small Cell Innovation Dual LTE/3G

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