LHC2 Inc.

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WMAN & WRAN Deployment Engineering Services

LHC2 Deployment Engineering Overview

Comprehensive and Timely Information Drives Workforce Productivity

Skilled Network Design, Deployment and Support

Wireless LAN deployments introduce new and unique challenges to even the most skilled network managers and support personnel. When the wireless LAN is extended outdoors, and is required to cover many square miles as in a WMAN (Wireless Metropolitan Area Network) or hundreds of square miles as in a WRAN (Wireless Regional Area Network), the challenge of scale can be overwhelming. In addition wireless network performance can be highly time variable due to changes in the propagation and interference environments forcing changes to traditional wired network tests and monitoring methods.

On the other hand the inherent productivity improvements associated with a dispersed and yet connected workforce easily justifies the effort to overcome these challenges.

Careful planning of the network and its associated acceptance testing will insure that the WRAN meets the original workforce productivity goals and is supportable into the future.

Scalable and integrated wireless network design insures that the responsible network management team can support and expand the network to meet the current and future needs of their network users.

LHC2 offers highly skilled wireless engineering services to assist the client in planning, designing, deploying and managing their workforce WRAN.

A phased Approach

Application Driven Networks Meet the User's Needs

Comprehensive Audit, Measurements and Interviews

Planning

Phase 1: Requirements Capture

Prior to the selection of a particular WRAN solution LHC2 will assist the client, on site, in identifying:

1) current and planned network services and security

2) applications and their expected network performance requirements

3) coverage and outage criteria

4) physical and environmental requirements

A comprehensive checklist will be captured in the Network Requirements Document. The client can use this documentation to articulate specific deliverables in the RFP and RFQ process and assess subsequent responses from prospective network providers.

Acceptance Criteria

Phase 2: Establishment of Final Acceptance Criteria and Test Plan

From the requirements captured in phase 1, specific network acceptance criteria and an acceptance test plan including field test methodologies will be documented as part of the Network Acceptance Criteria and Test Plan Document.   These field tests are designed to mimic the loaded production network in the wireless environment to stress network services and expose network performance issues.

Network Design

Phase 3: Overall Network Design

LHC2 will employ network equipment specifications, configuration information, topography and vegetation information along with on site experimental results to design the wireless network infrastructure and client topology. LHC2 will use industry tested RF propagation models and fade margins that will typically result in the highest physical data rate capable in the chosen system.

LHC2 can design, deploy and test experimental pilot wireless networks to allow the client to validate performance and applicability. (i.e. Client Mesh vs. Infrastructure Mesh vs. Central Base station approach)

Deployment

Phase 4: Network Deployment and/or Supervision

LHC2 can offer complete installation management services or assist the client with supervision services during the network deployment. LHC2 engineers are skilled in power and network backhaul provisioning as well as static grounding and surge suppression.

Phase 5: Final Acceptance Testing

Execution of the acceptance test plan, captured in phase 2, can initially be provided by LHC2 staff. LHC2 offers a WRAN boot camp to quickly and comprehensively train network managers for successful WRAN management and expansion.

Summary of Deployment Engineering Services

- Business modeling for Private Wireless Networks
- Application Identification
- Application Mobilization Testing
  - Network Link Outage Resilience
  - Application Persistence and Stability
    - Under High Packet Error Rate
- User Surveys and Interviews
- Acceptance Criteria
- Acceptance Test Plan and Execution Services
- Wireless Network Methodology Selection
  - Infrastructure Mesh
  - Client (Peer to Peer) Mesh
  - Base Station
  - Private Cellular
  - Rapid Deployment
  - Network Management
    - Security
    - EMS (Element Management System)
      - Network Operating System
    - NMS (Network Management System
  - Network Services
    - VLAN
      - VPN
      - Security
      - Policies
      - DHCP, DNS
      - VoIP
      - QOS
      - Video
      - Text Messaging
      - AVL
      - Location Services
- Pilot Network Design
- Propagation/Coverage Modeling and Prediction
- Link Budget Analysis
- Interference Analysis
- Coverage Mapping
- Throughput Analysis and Prediction
- Network Tuning
  - Channel Selection
  - Transmitter Power Planning
  - Receiver Threshold Planning
- Site Survey
  - Identification of Enterprise RF and Microwave Radiators
  - In Coverage Area Interferers
  - Topography and Vegetation
- GIS based Network Planning
  - Infrastructure Site Selection
- Power Provisioning
- Static Grounding
- Aesthetics Management and Solutions
- WLAN, WMAN and WRAN System Support