Localisation
The right information at the right time and the right place

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Agenda

- Visibility Solutions
- Location Appliance Architecture
- New Features and Functionality
- 3rd Party LBS Applications

Location Based Services Applications

Problems areas addressed:

- Lack of visibility into the location of valuable assets and key staff
- Inefficient allocation and use of people and equipment
- Excessive cost of leasing & equipment purchases to offset lost or stolen items
- Unsatisfactory service resulting from long wait times & wasted search times
- Security issues linked to lack of insight into the location and movement of goods and people

Visibility Solutions

4 key pieces of information

- What Do We Have?
- How Many Do We Have?
- Where Is It?
- What Is It's Status?

Real-time Location Tracking

Infant X is in room Y

Presence

Pallet X is on the line

Choke-point

Vehicle X entered the terminal

Immediate Location Updates

Features

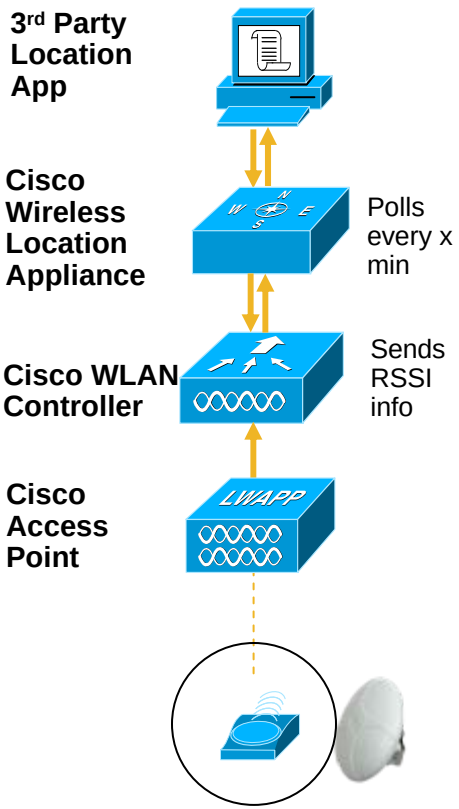
- Sends location information to Third Party Application once the location event is detected
- Location event can be client, Wi-Fi phone, client rogue access point, rogue client and Wi-Fi tag

Benefits

- Improved response time and accuracy of devices
- Essential for time critical applications such as locating a maintenance person or monitoring perishable items

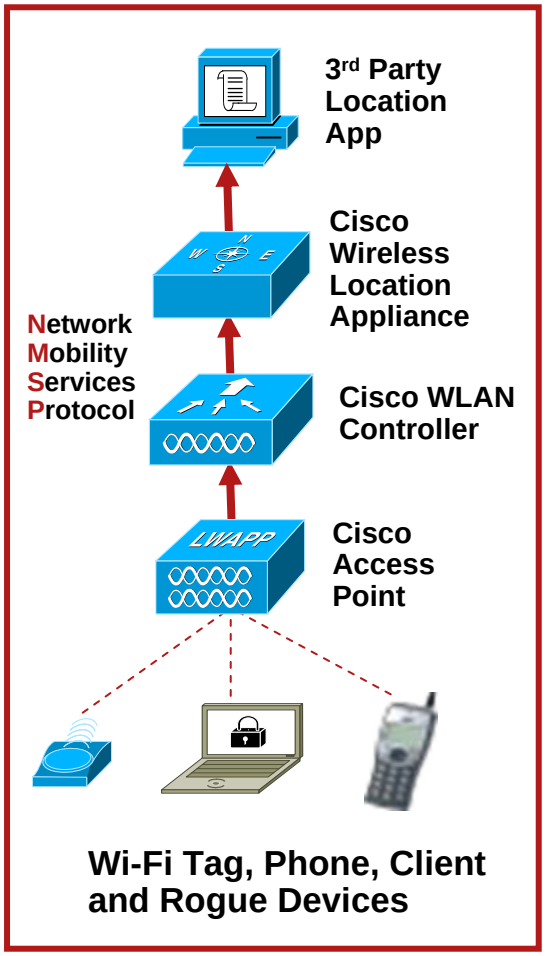
Before

Location updates based on pre-set polling time



Now

Location updates sent immediately from devices



WCS, Controllers, and Location Appliance

- WCS is the single “front end” for location
- All configuration and management of the Location Appliance is done through WCS
- Visual representation, as well as historical replay of location data is performed by WCS
- Network Designs kept in both WCS and the 2710
- Device information is temporally stored on controllers and polled or pushed to the Location Appliance

Chokepoint Support

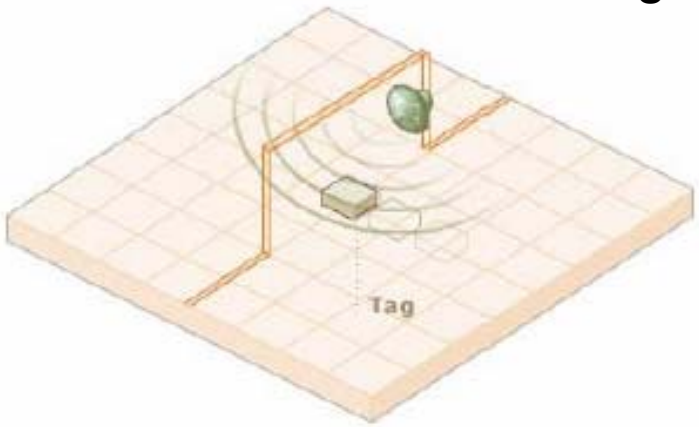
- Deterministic Location-Based Notifications
- When an active RFID Tag moves to within a defined proximity of the exciter the active RFID Tag begins transmitting packets advertising its location in relation to the exciter
- These packets are captured by the infrastructure and forwarded to the location server with high priority
- Allows for very precise localization (per shelf, per cabinet, entry, exit, etc.)
- Uses 125Khz based chokepoints

See Aeroscout Exciter datasheets for exact accuracy specifications
http://www.aeroscout.com/content.asp?page=exciter

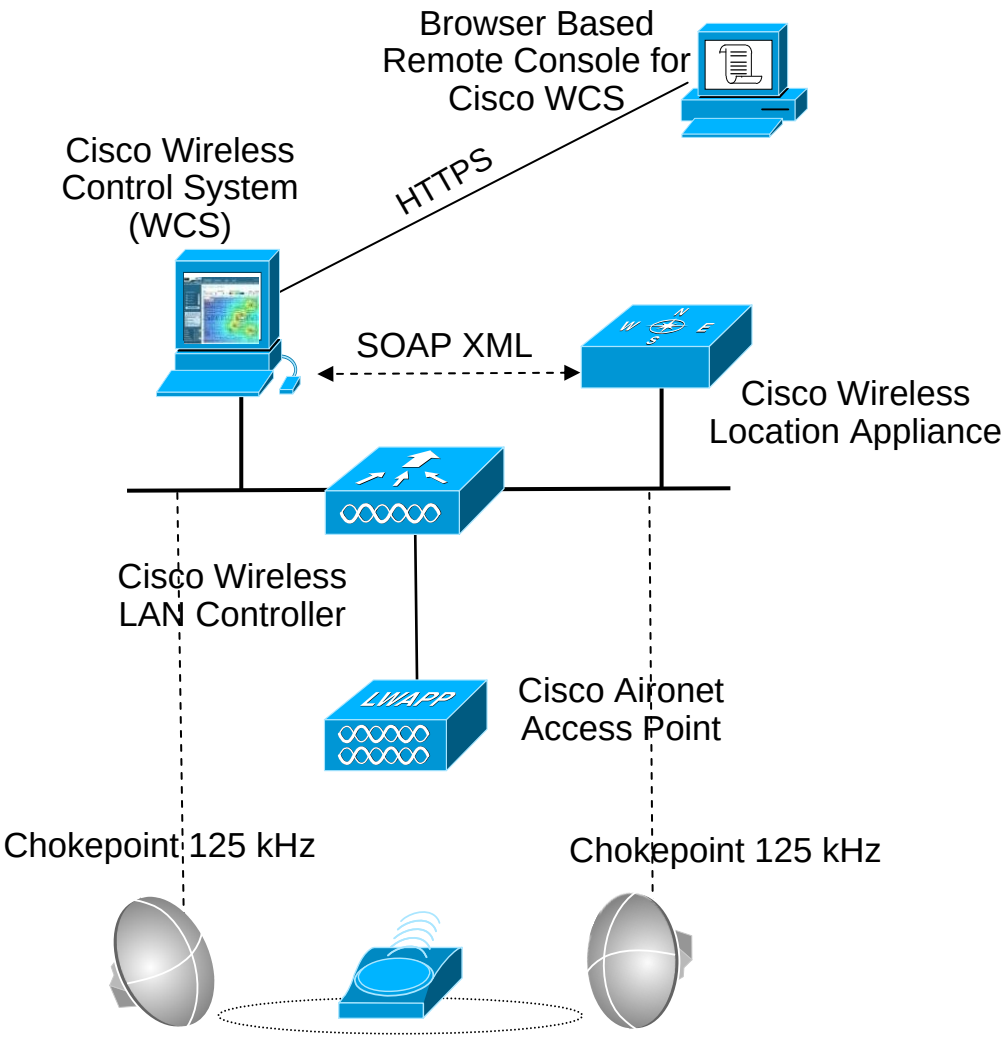
See WhereNet WherePort datasheets for exact accuracy specifications
http://www.wherenet.com/products_whereport.shtml

EX-3200
2.5m range

EX-3100
6m range



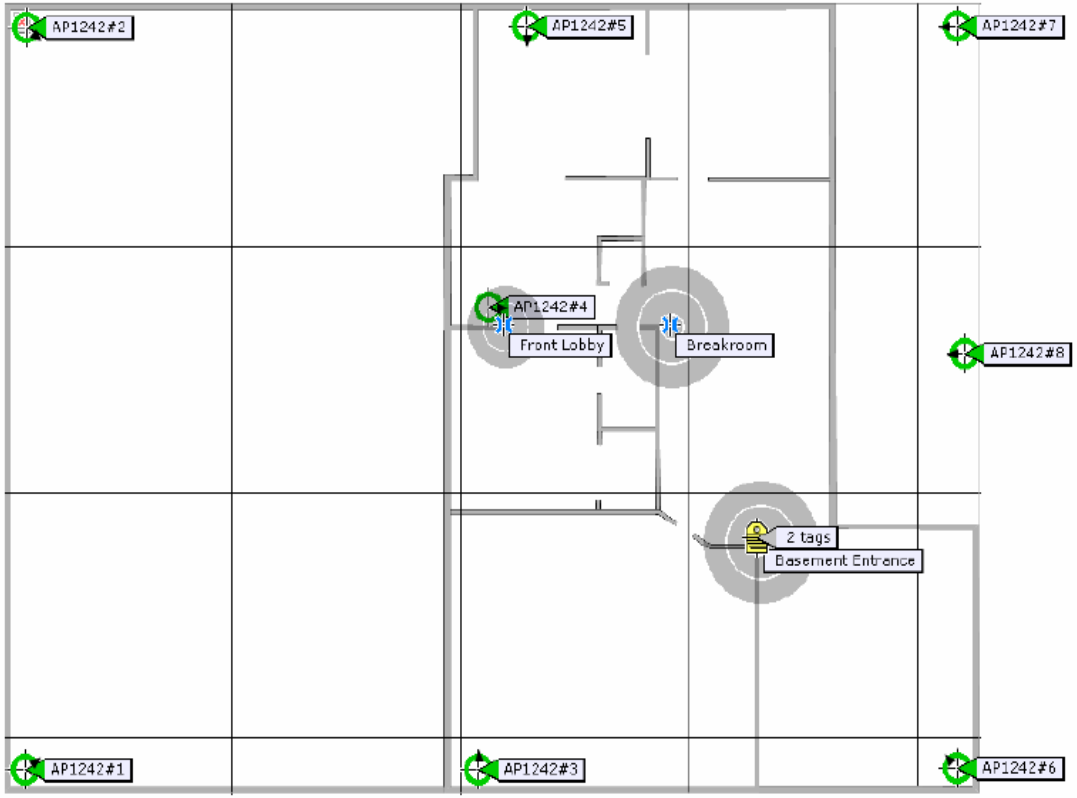
Chokepoint Architecture



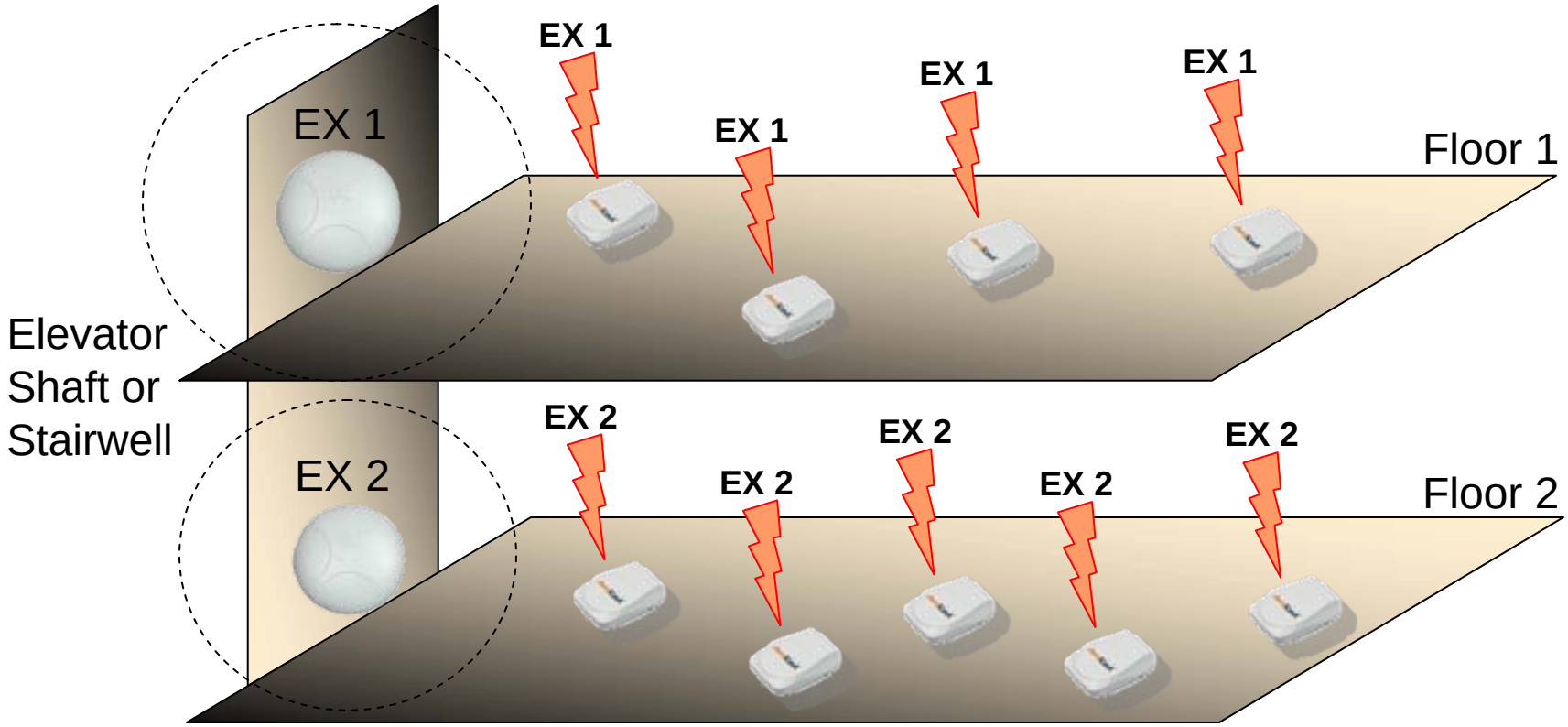
1. Device with a Wi-Fi tag moves into a zone with a chokepoint.
2. The chokepoint “triggers” the TAG using 125Khz radio.
3. TAG receives configuration or messages using 125Khz radio.
4. Wi-Fi tag sends chokepoint information to the access point using its 802.11 Wi-Fi radio.
5. Access point sends information on to the controller which consolidates the information and asynchronously sends it on to location appliance.
6. Location appliance sends chokepoint’s location and any other information to Cisco WCS or a third party solution.

Chokepoint Placement

- Chokepoint physical location and coverage range configured into WCS
- Tag's entering the stimulation zone of the chokepoint will transmit unique information to the LBS overriding any x,y coordinates when selected
- A Tag exiting a stimulation zone will revert back to normal RSSI tracking on its next regular beacon



Basic Principals



- Note that every tag reports a Chokepoint ID in every transmission.
- Since the location server knows the last known Chokepoint of each tag, it also knows the correct floor the tag is on.

Inter-floor Configurations

- Chokepoint Technology Only

  Notifications are triggered by chokepoints (AeroScout/WhereNet) as the Wi-Fi tags come within range of a chokepoint.

  CCX Tags can store the 5 last chokepoints (perimeter) crossed where one is reserved for storing entry/exit chokepoint.

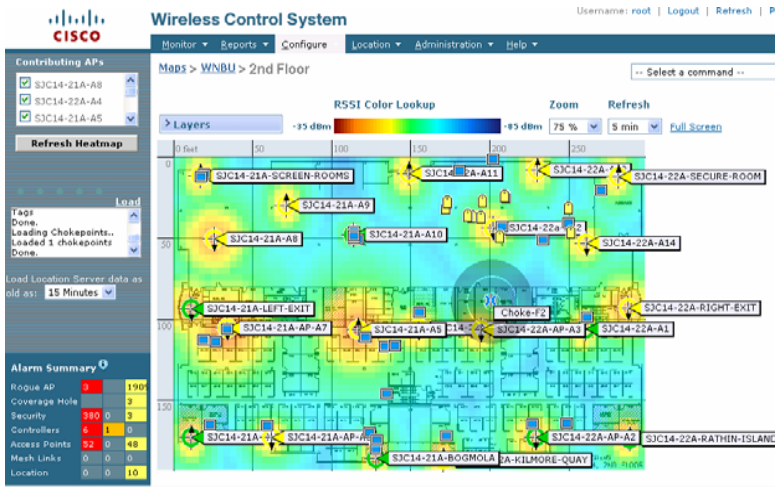
- RSSI Algorithm only

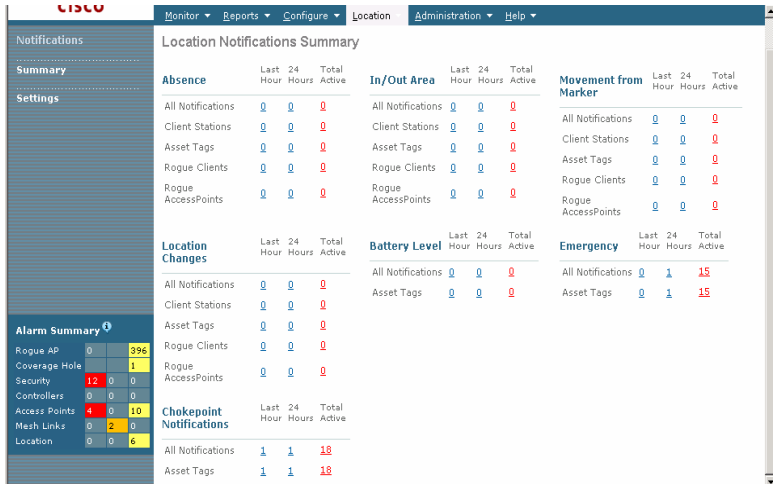
  Inter-floor differentiation even if chokepoints are not preset

- Simultaneous use of both methods

  Chokepoints + RSSI Algorithm

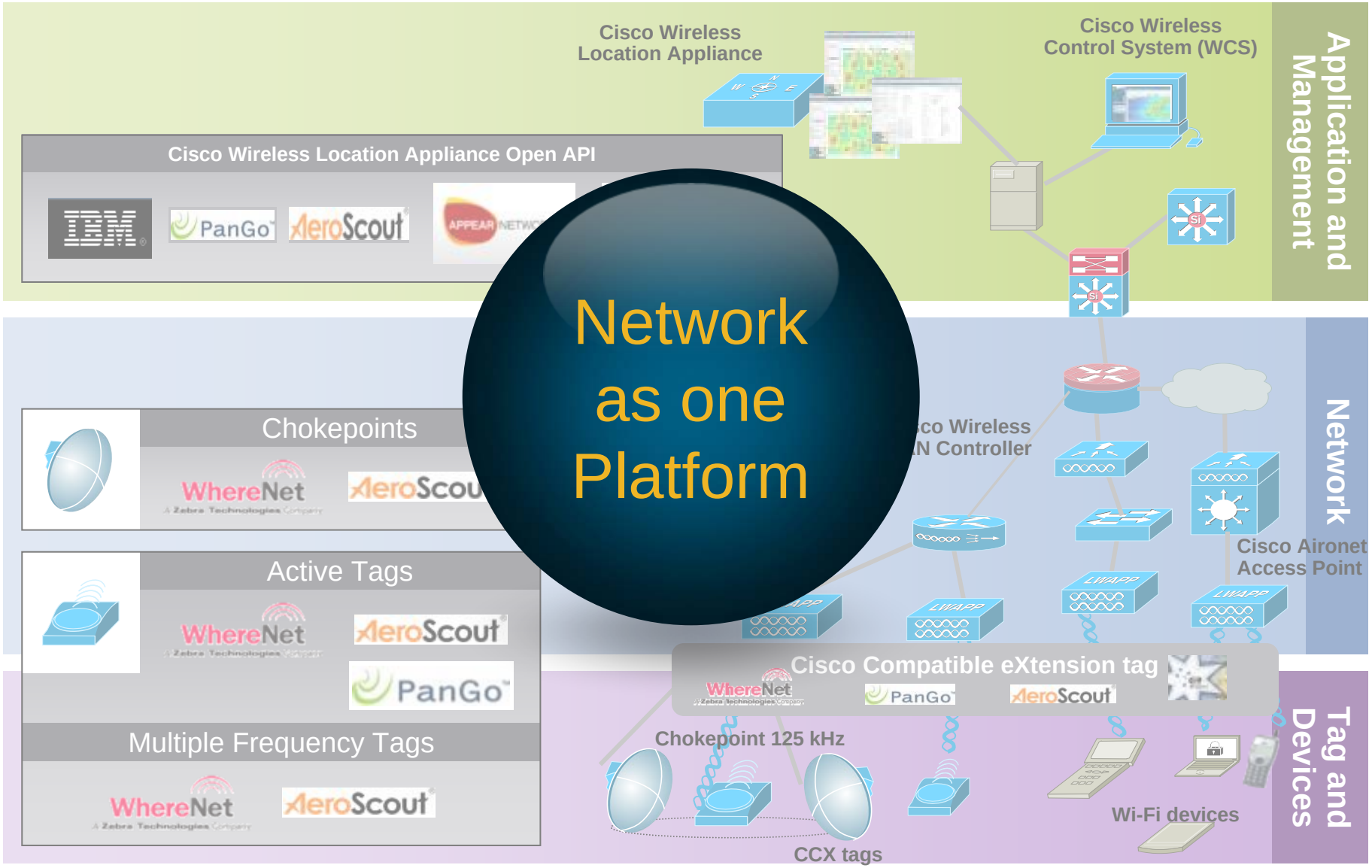
  For location calculations, algorithm makes use of RSSI values **and** Perimeter Chokepoint information





3rd Party LBS Applications
&
Solutions

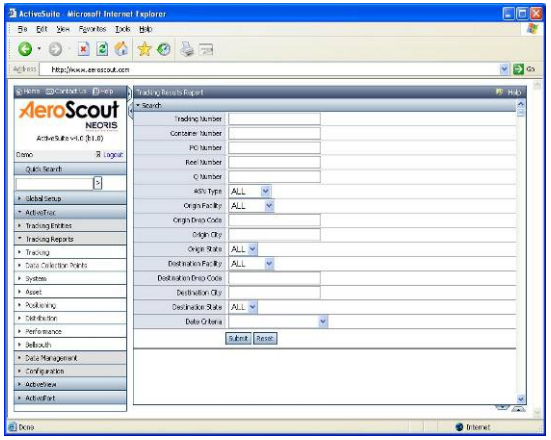
Cisco Location Solution
The right partners for the right solution



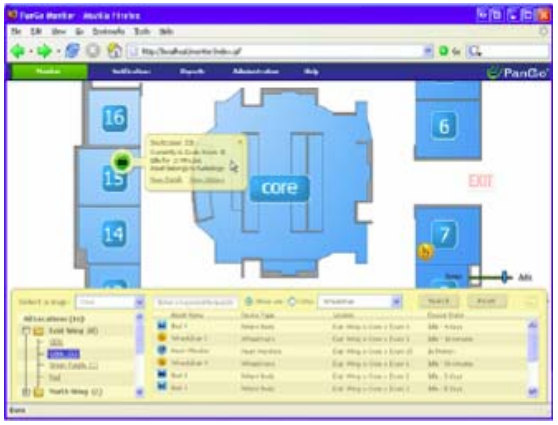
Location Application Middleware

Why do I need Third-Party Middleware if I already have Cisco LBS?

- Intuitive user interface for true asset visibility – designed for business users (vs. IT personnel)
  - Floor plan or table view of asset location and information
  - Sophisticated asset search and filtering
  - Industry-specific (e.g., healthcare) asset icons and group representation
- Event management
  - Location-based, state-based (e.g. motion), and battery status e-mail notifications and alerts
- Reporting
  - Current and historical location, movement and asset/tag information
  - Custom reporting using ODBC/SQL
- Asset tag and Exciter configuration and management tools
  - Define asset information (name, type, owner, serial #, etc.) for tracking, search and filtering
  - Link tags with assets and related asset description data
  - Define network, reporting frequency and security settings
- System Integration
  - Asset import tools
  - External Hyperlinks: Information, Video, E-mail
  - Additional APIs for enterprise integration



AeroScout MobileView



PanGo Locator

Manufacturing

Manufacturing Visibility Problems

- Products, inventory, equipment and employees are increasingly on the move
- Aerospace, semiconductor and other manufacturers misplace mobile toolkits, machinery, parts and WIP inventory, at a cost of as much as $1 million per incident
- Understanding this movement is critical to optimizing business performance

Location Services in Manufacturing

Problem: Under utilized equipment, misplaced inventory and complex WIP processing reduce manufacturers' efficiency.

Work-in-process

Equipment tracking

- **Workers spend hours per shift searching for shared equipment & tools**

Inventory tracking

- **Better visibility to finished goods increases dwell time and reduces errors, capital and labor.**

- **Loss and misplacement of work-in-process engine items is a multi-million dollar problem**
- **Manual searches for WIP parts among thousands of orders**

- **Automatic tracking of item processing location**
- **Higher quality control, reduced WIP loss, less labor and faster manufacturing times**

Aerospace Manufacturing

Problem:

- WIP parts (sub-assemblies) are misplaced on staging floor, forcing assembly to stop until they are found.
- Government aircraft assembly involves periodic tool audits, which carry heavy fines for missing tools.
- Misplaced parts/tools result in low productivity for a highly-paid labor force.
- Quality issues due to human errors causing rework and delays
- Billing and productivity are slowed due to a manual progress-logging system.

Aerospace Manufacturing, cont.

Solution:

- Track high-value WIP parts and highly mobile tooling with AeroScout tags and standard WLAN equipment.
- Cisco AP's and AeroScout Location Receivers determine accurate location and movement of assets.
- Improve labor productivity by eliminating manual searches, tracking and report preparation.
- Production progress is automatically logged based on location, reducing manual logging time.
- Audit fines are reduced, as all tools can be found in a timely fashion.
- Automated alerts warn if a part is removed prematurely, reducing the threat of assembly stoppage.

Context Aware Applications

Kista – Wireless City

The Kista Mobile Showcase promotes mobile applications, solutions and services found in the Swedish high tech region, home to over 700 companies and more than 27,000 employees.

Issue

- **Kista Mobile Showcase needed to deploy a user friendly wireless solution to demonstrate mobile applications in the City of Kista**
- **The system must be able to easily include third party applications and support a wide range of Wi-Fi enabled mobile devices**

Solution

- **The wireless deployment consists of Cisco Wi-Fi access points distributed through out Kista Science City points of interest, including the Kista Shopping Mall, combined with the Cisco 2700 Location Appliance**
- **The Appear Context Engine recognizes the user's context (location, profile, time of the day, etc.) and enables the push of new services related to their particular context, for example location-based customer information in the shopping mall**

Benefits

- Personalized location-based services automatically appear and disappear from the visitor's mobile device, according to his precise location
  - as the user walks around the mall, promotions from nearby shops are pushed
  - walking by the lunch court triggers a list of menus available
  - upon entering the subway station an updated timetable becomes available

"This demonstration of context-aware wireless services is an important part of this groundbreaking city-wide showcase. Appear was selected to join the consortium because their hardware-agnostic, application-independent platform allows us to easily include other third party applications."

Tomas Bennich, Project Manager, Kista Mobile Showcase

Kista Galleria – A Few Facts

- Completely renewed in 2002
- Expanded from 25 000 km2 to 76 000 km2
- Over 140 shops
- Over 30 restaurants
- Multiplex movie theatre with 11 rooms
- Over 1 million visitors per month
- Outside the mall is a city-wide deployment of 110 Wi-Fi access points covering the city's points of interest

Most successful mall in Northern Europe!

Next Generation Mobile Solution

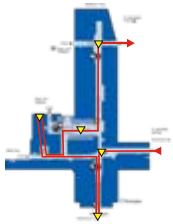
- **Information Filtering**
  - **Information push means new constraints on information filtering**
    - Only the right data should be pushed
    - Relevance of information is highly dependant on the workers' situation
      - Time
      - Location
      - Role
      - Type of device
      - Bandwidth available
      - ...
- **Context Engine**
  - **An extra layer of computing intelligence is required in order to deliver an effective solution for mobile users:**

Context-Aware Services

Kista Galleria – Points of Interest & Services

- **Shops and Supermarkets**

  Push of special offers
  Marketing surveys
  Geoguiding Map (you are here? where am I going?)




- **Food Court**

  Lunch menu
  Gaming, News
  Community chatting, Virtual post-its

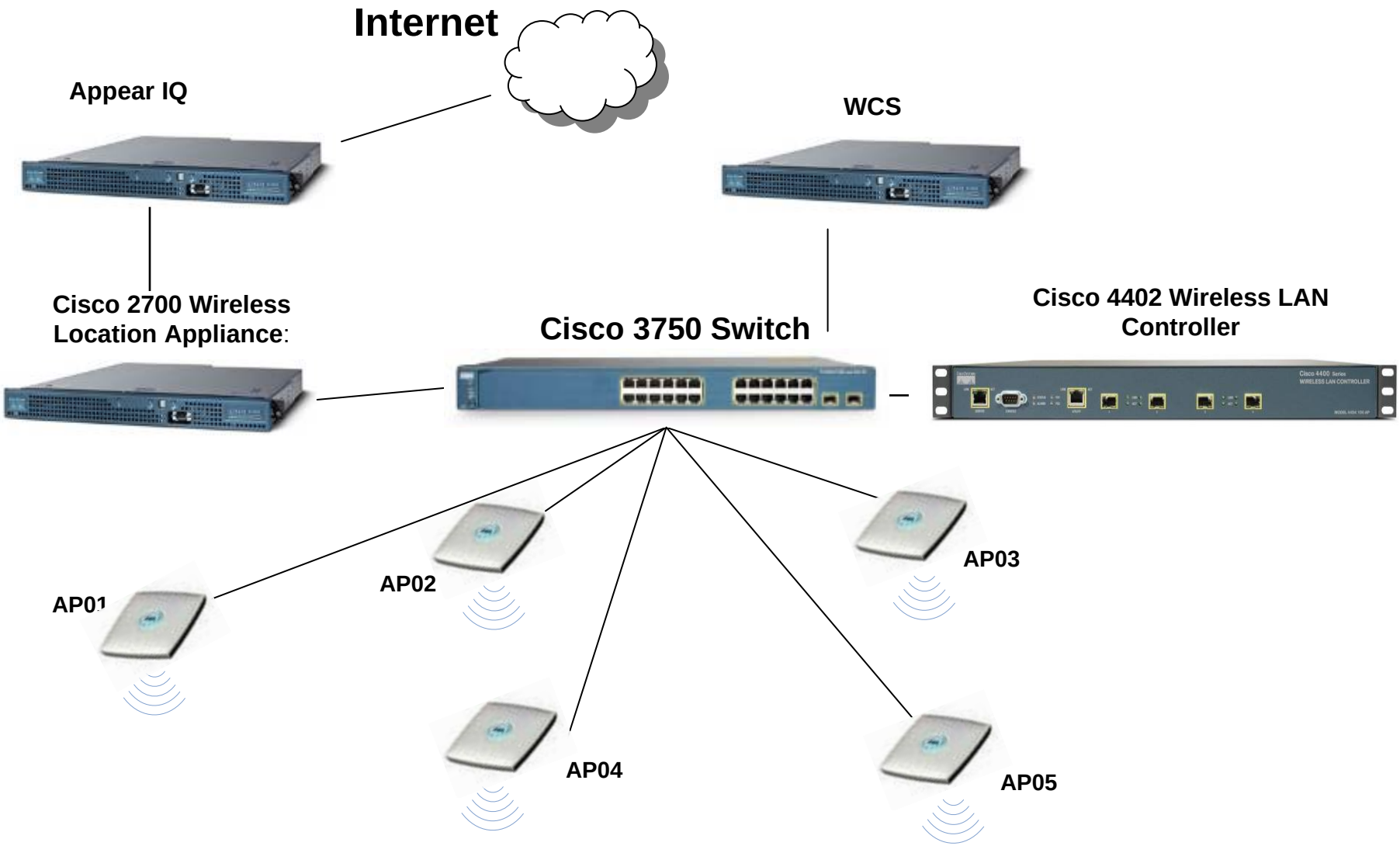

- **Movie theatre**

  Movie trailers
  Ticket booking & purchase

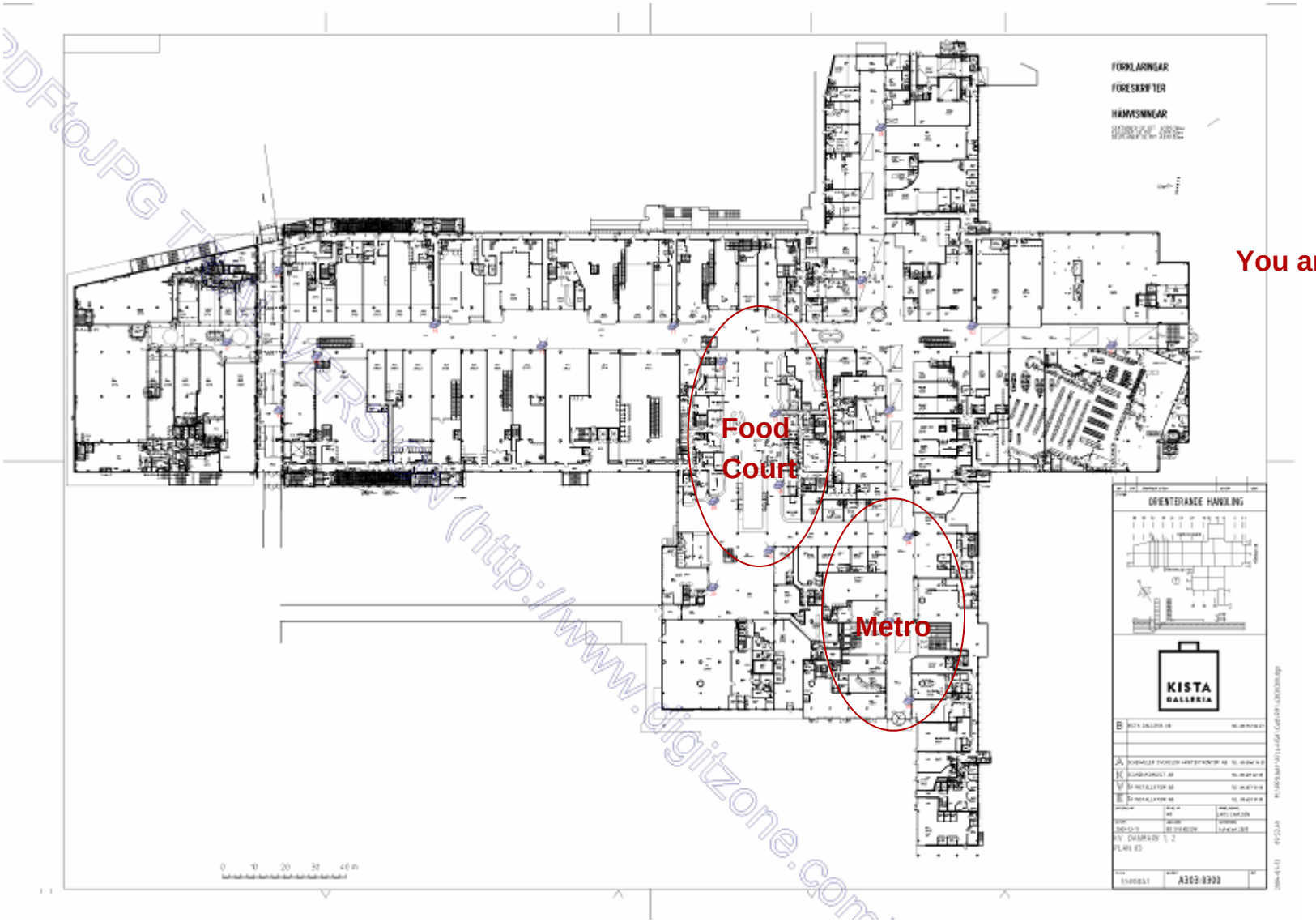

- **Subway station**

  Travel planer
  Traffic disruption information
  Interactive map

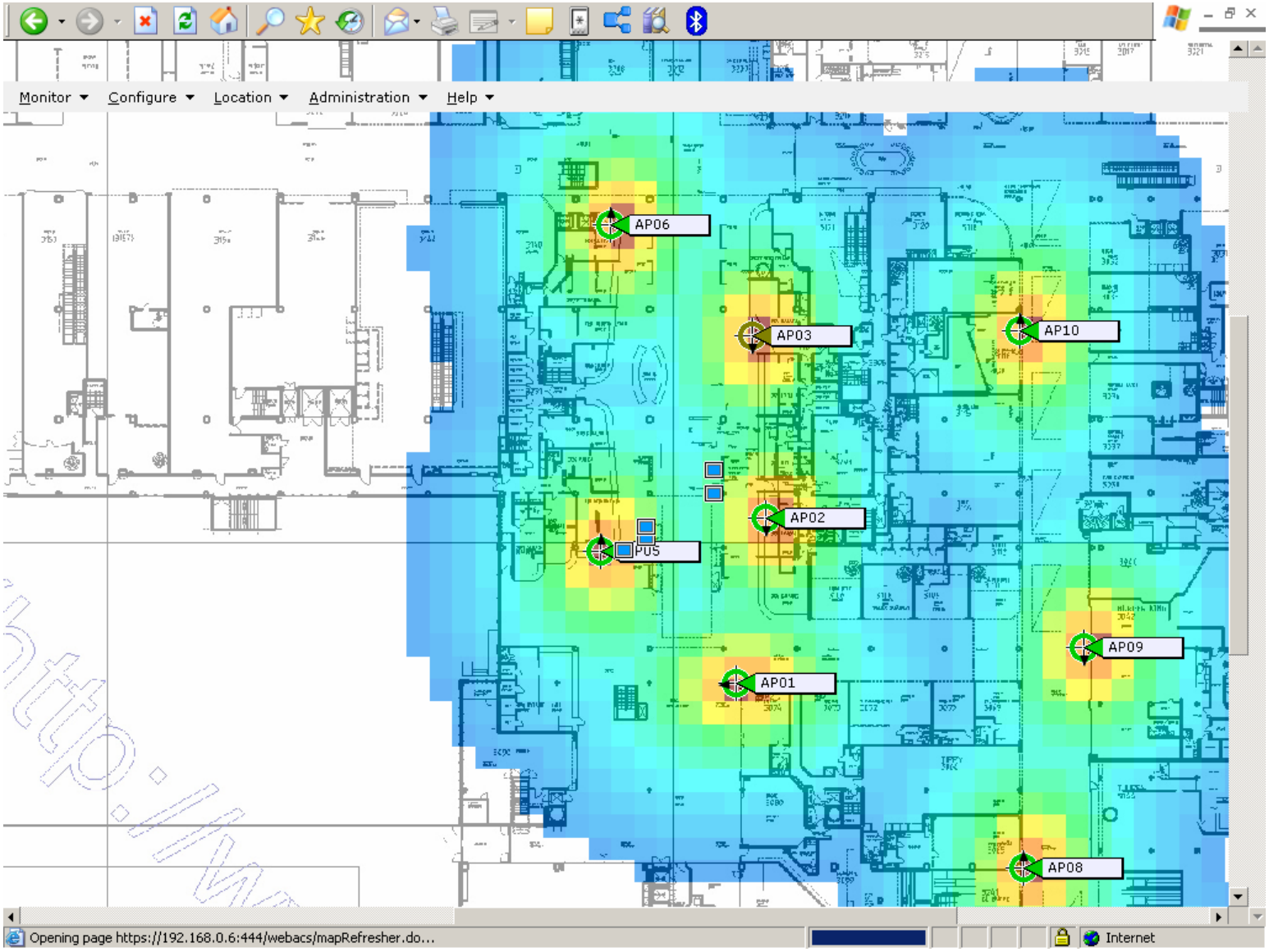
Kista Galleria - A centralized deployment



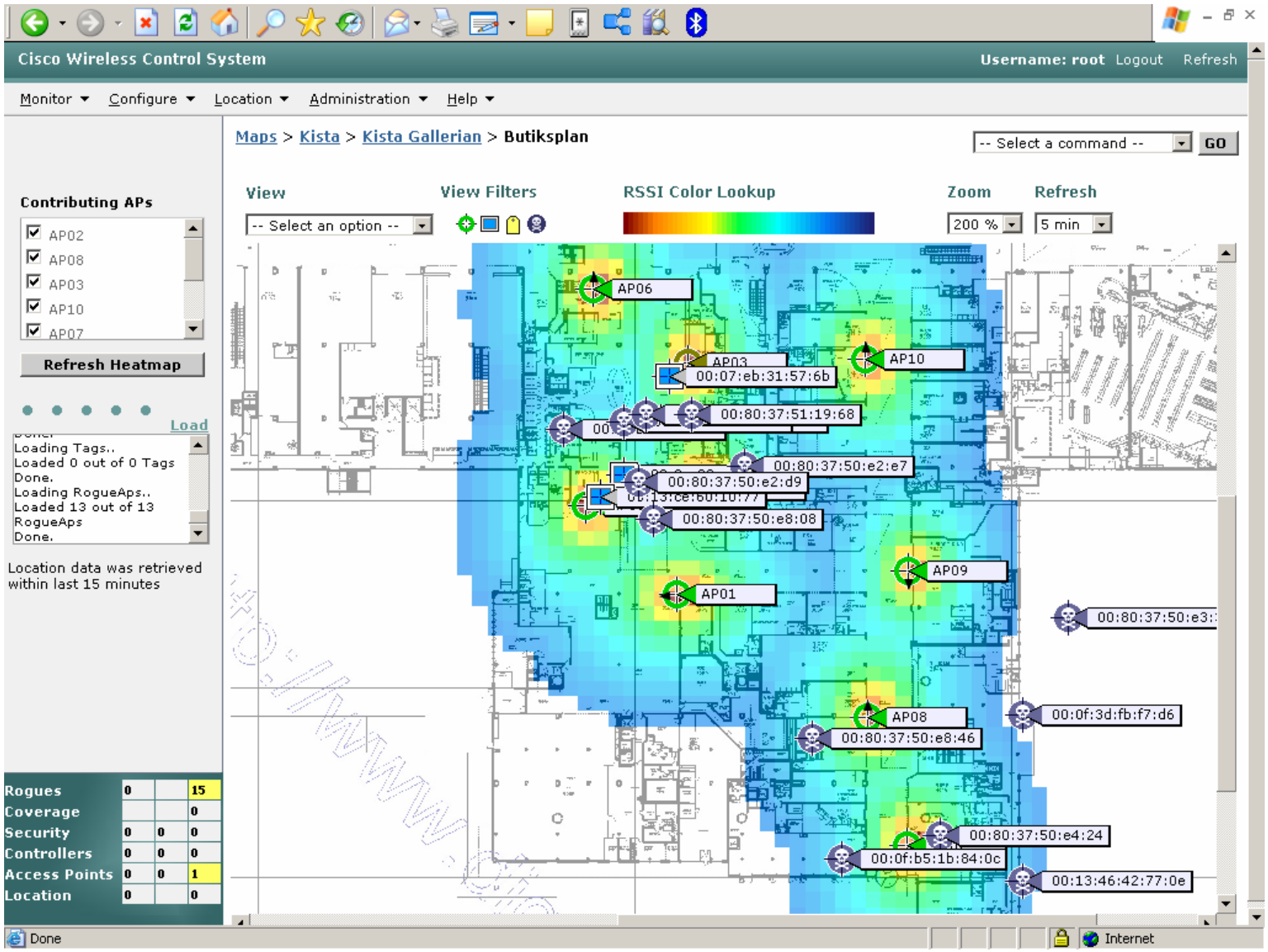
Kista Galleria – Layout



Kista Galleria – Coverage 1/2



Kista Galleria – Coverage 2/2

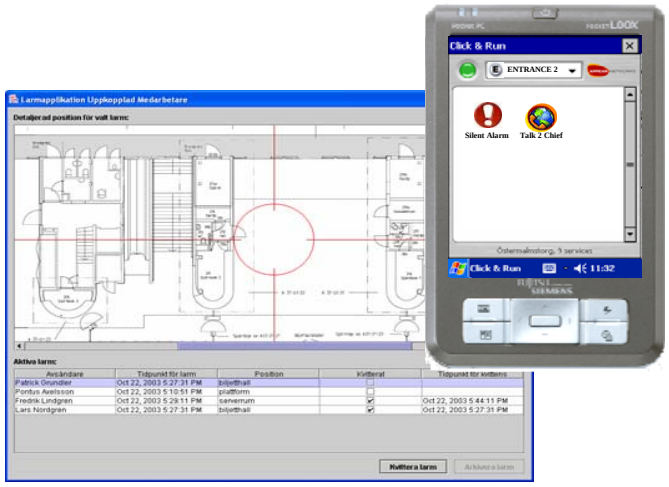


Storyboard - Travel & Transport Scenario

Public User Storyboard

- The user enters Kista subway station → new services appear
- The user accesses video-cameras showing road traffic. Seeing that the traffic is heavy, he decides to take the subway instead.
- The user downloads a clickable travel information planner & map in order to find the best route to reach his next destination, taking in account his current location
- Before boarding the subway, the user downloads his favorite newspaper to read on board the subway.

Storyboard - Travel & Transport Scenario



Field Worker Storyboard

- A Connex employees approaches Kista subway station → new services appear
- The employee accesses a form to report graffitis or faulty equipment, location is recorded
- The employee downloads a clickable travel information planner & map in order to find the best route for a customer to reach his next destination, taking in account is present location
- The employee presses on a silent alert button to notify the command and control center of a security alert, location is recorded
- A short sequence shows the security personnel in the command and control center receiving and acknowledging the alert
- The employee receives the acknowledgement

Storyboard – Retail Scenario

Public User Storyboard

- The user enters Kista Galleria → new services appear
- The user accesses the list of shops and their location
- A pop-up appears on the user's screen announcing a particular promotion at a nearby restaurant
- The user accesses the list of menus available from the food court
- The user accesses a movie trailer while eating his lunch in the food court

Storyboard – Retail Scenario

Field Worker Storyboard

- A security employee enters Kista Galleria → new services appear
- A pop-up appears on the user's screen with a security alert in a close-by area
- The employee accesses a nearby surveillance video feed to confirm the situation
- The user calls his closest colleague, location of all users in the vicinity is taken in account to route the call

Point of Presents Application

Safety and Environmental Application

GROTTE DELL'ANGELO DI PERTOSA

- Problem

  Cave owner in Italy identified that heat and lighting, together with CO2 discharge from visitors was effecting the cave environment.

- No communication with visitor groups during a tour
- Photosynthesis causing flora to grow destroying the exhibits
- Solution

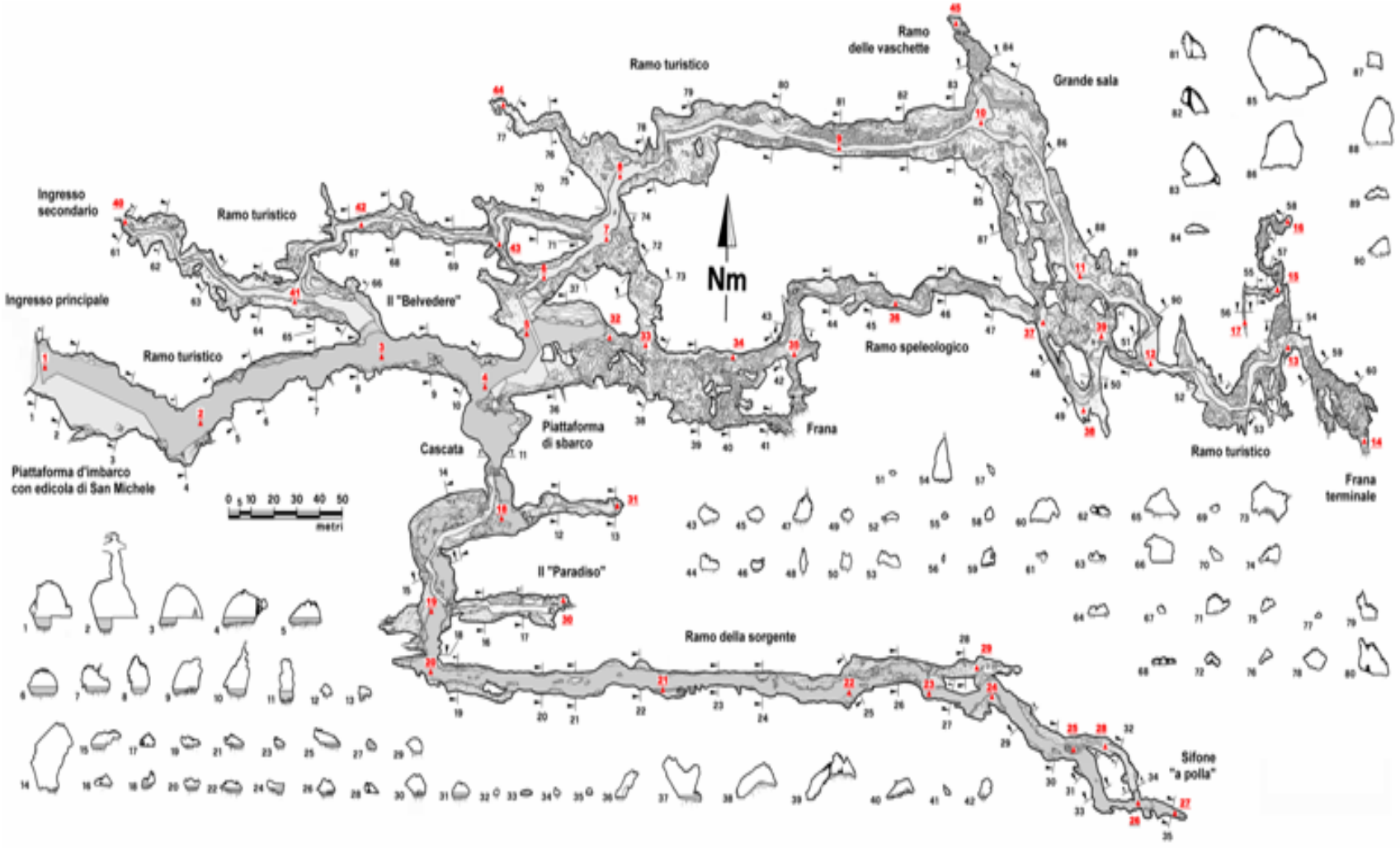
  Reduce heat & light by activating lighting when visitors are at the appropriate location

- Install a communication system for tracking, information and emergency calls

Comune di Pertosa
Provincia di Salerno

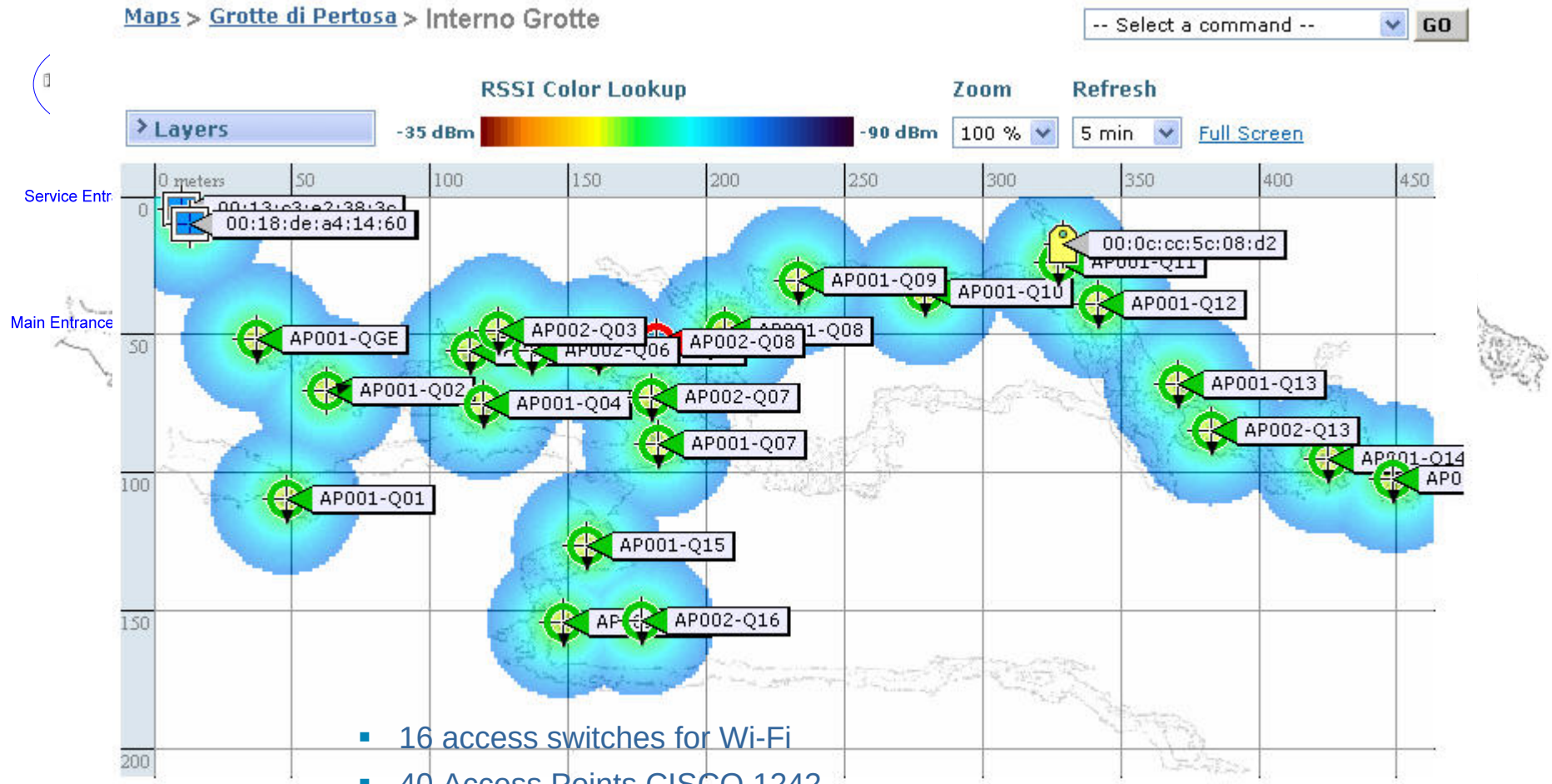
Cave Layout

GROTTE DELL'ANGELO DI PERTOSA



Location WiFi Network

GROTTE DELL'ANGELO DI PERTOSA



- 16 access switches for Wi-Fi
- 40 Access Points CISCO 1242
- Full WiFi VoIP coverage
- Redundant fiber optic backbone forming the Network infrasrtucture

Complete Your Online Session Evaluation

Please complete the online evaluation under

www.cisco.at/expo2008/feedback

The first 100 to complete the survey will receive a copy of Don Tapscott´s book “Wikinomics”.

We very much appreciate and value your feedback, many thanks!