# *University of Michigan Campus-Wide DAS Project ExteNet Systems Implementation*

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# The University Situation

- Cell phones are nearly ubiquitous for faculty, staff, students, and visitors
    - For personal and work communication
    - Increasingly as a teaching and learning tool
- Cellular replacing land-lines in some campuses and becoming key to mobility strategies
- Cell phones are important for safety and security
- 70% of cellular calls and 80% of data connections originate from indoors (Strategy Analytics)

# The Problem

- High percentage of building space has poor cell reception

- Testing in 200+ buildings and 25M square feet on UM campus showed:

  - About half our space (~13 million square feet) needs augmentation

  - Problem is worse in new buildings due to thermal/shielded glass

- Additional <u>capacity</u> problem in sports venues on game days

# "So Let's Fix It" UM said

## *Project Goals – To Expeditiously:*

- Have high quality voice and data cellular service,

- For multiple carriers,

- Representing at least 70% of the cellular marketplace,

- In all university-owned buildings over 10,000 square feet,

- On the Ann Arbor, UM Hospitals, Flint and Dearborn campuses,

- With costs absorbed by carriers

# Oh…One more Problem

- We own the buildings, but not the spectrum
- We need full Wireless Service Provider support to do anything
  - Detailed engineering attention
  - Financial commitment
- This is expensive
  - Financial commitment is easier if you are a big "public venue" (mall, airport)
  - Or if you're a "private venue" and buy handsets
- The University is neither (except game days)

# Progress

- Issued RFP and hired 3rd-party "Neutral Host" service provider – <u>ExteNet Systems</u>
  - They build a multi-vendor network and sell service on it to the WSPs
  - They too need WSP engineering support and WSP financial commitment
- First priority was UM Stadium and new Mott Children and Women's hospital
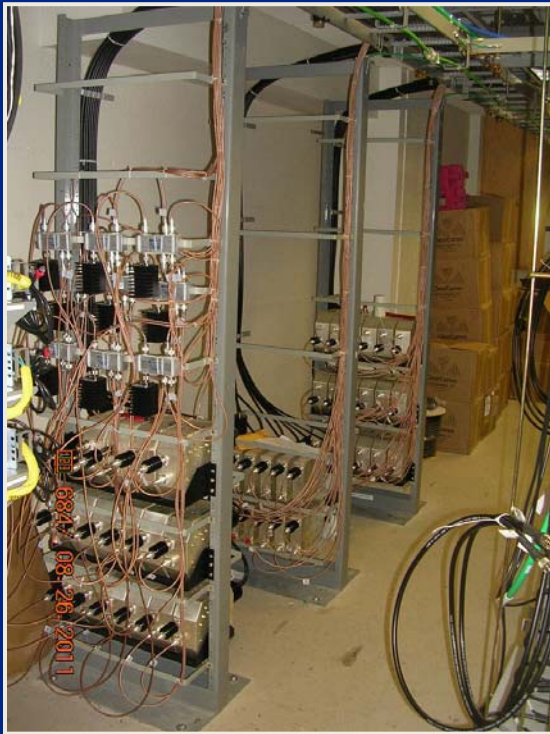
# Technical Architecture

- 64 outdoor DAS nodes serve smaller buildings

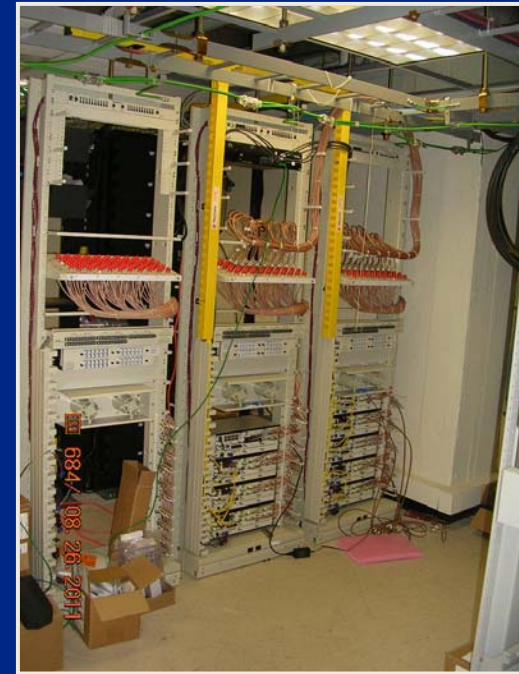- Indoor nodes for buildings >200,000 SF



Antennas match roof



- Antennas against Brick

- Also some on poles

# Infrastructure is Complex and Expensive
## *HeadEnd Components*:



Optical to RF Conversion Equipment



Point of Interface (POI) Racks



Carrier Base station equipment to connect to their macro network

# Michigan Stadium – The Big House

*3ʳᵈ Largest Stadium in the World –*
*114,804 People at Notre Dame Game*



- 135 Antennas
- 60,000' of ½" coax
- 4,500' of New Conduit
- 17 Node Sites
- Indoor and outdoor construction
- Construction completed in 45 days

# New Mott Children and Women's Hospital



- "New Extraordinary Building"
- Lots of shielded glass
- 1.1 Million GSF, 12 Floors
- 11 Expansion & 65 RAU hub locations
- 390 Antennas (6 Antennas/RAU)
- Passive Backbone built to accommodate multiple WSPs –Backbone construction completed in 30 days



**University of Michigan Health System**

# The University Doesn't Control Pace
## *Neither does our Vendor, ExteNet*

- Much slower than University needs
- It's all about what the Wireless Service Providers (WSPs) want to fund
  – Verizon is on the stadium DAS, Sprint isn't
  – AT&T has a temporary system in stadium, and is considering design iterations on the DAS
  – University fronted the capital for the initial hospital build for Sprint's IDEN
  – Verizon is ready to build at hospital; AT&T is working through design iterations;  Sprint expressed interest

# What is the Infrastructure Model?

- Not like water, electricity, Internet, POTS, Centrex
  - Building owner constructs or extends indoors
  - Building owner manages indoor infrastructure
  - Connects to service provider at building demarc
- With Cellular, the demarc seems to be the handset
  - But service providers don't consistently provide their service all the way to the handset

# The Future Isn't Clear

It *is* clear that we can't wait 5 years for our buildings and 3.5M SF of hospitals to be fixed

- We are working on new technology options that may help reduce expense
- We look forward to LTE's TCP/IP basis
- We are talking with our colleagues at other universities on strategy
- We are interested in Agency perspectives and activities