

# Building Technologies For Commercial Buildings



*Security, Automation and Technology that works*



# AGENDA

- Smart & Highly Integrated Buildings
  - History
  - Definitions
  - What has changed?
  - Structure Cabling
  - Technologies Deployed
- Tenant & Operational Technology Demands
  - Information Dashboards
  - Building Apps
  - Metering
  - Overtime AC
  - DAS
  - Parking Technologies





# SMART & HIGHLY INTEGRATED BUILDINGS



# “SMART” BUILDINGS - HISTORY

- ◉ Highly complex software development deployments between disparate micro computer based systems
- ◉ Very expensive to develop and deploy
- ◉ Typically bundled offerings of major system providers of “shared tenant services” (circa 1980’s)
- ◉ Profibus, CABbus, Modbus RTU (circa 1980’s)
- ◉ BACnet & LONworks(circa 1990’s)
- ◉ Security industry API developments (circa 1990’s)
- ◉ TCP/IP (circa 2000’s)
- ◉ Plug & Play begins



Systems Integration Skyrockets

# “SMART” BUILDINGS

- “Smart” Buildings and “Integrated” Buildings are broad terminologies:
  - Special structured wiring?
  - Single platform for all buildings systems?
  - Structured cabling supporting BMCS, security, telecom, etc?
  - A BMCS interfacing to switchgear, variable speed drives, chillers, electrical meters?
  - Integrated building network
  - Mobile interface for tenants?

IBM

Cisco

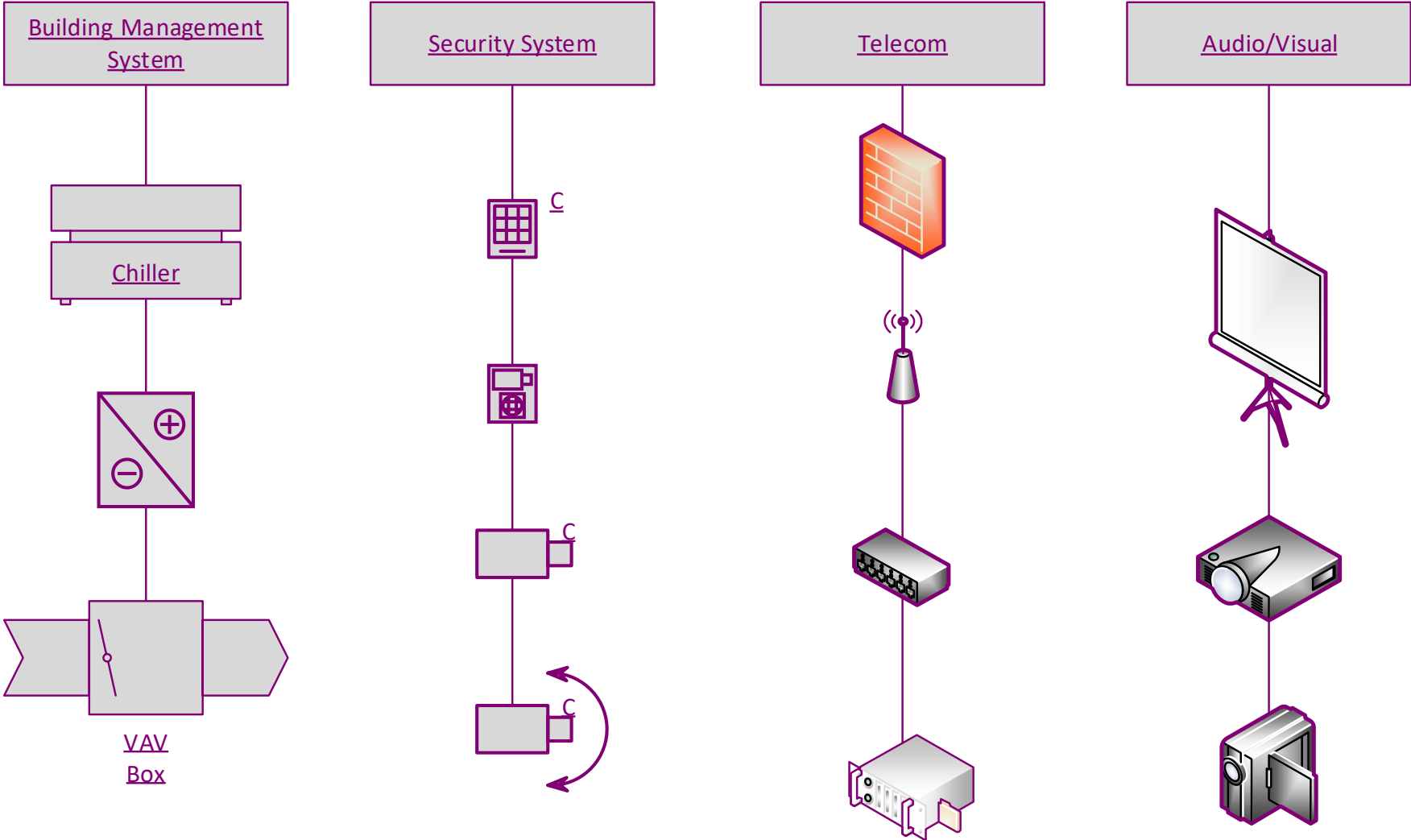
Accenture

Euro Com

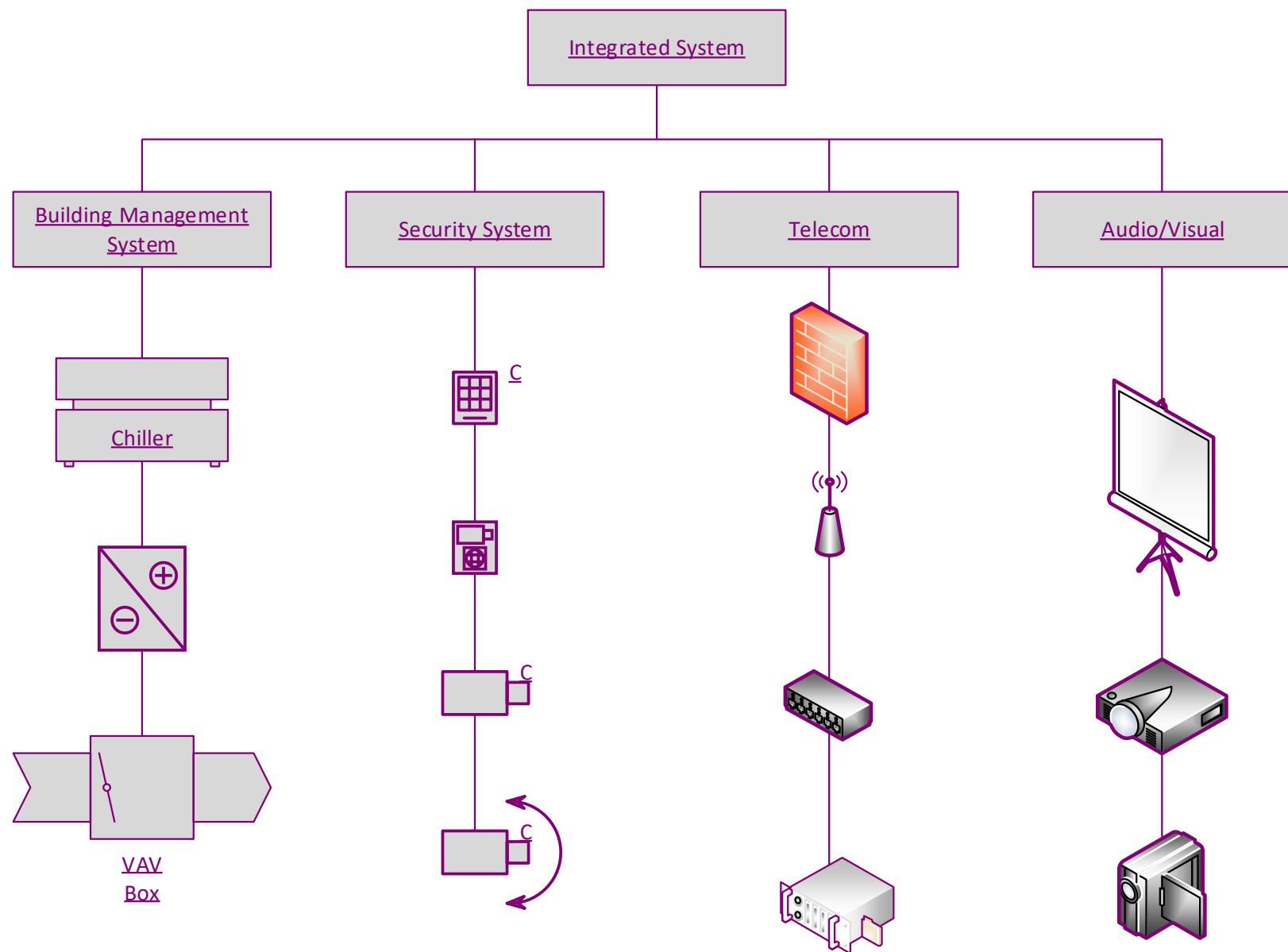
SBI



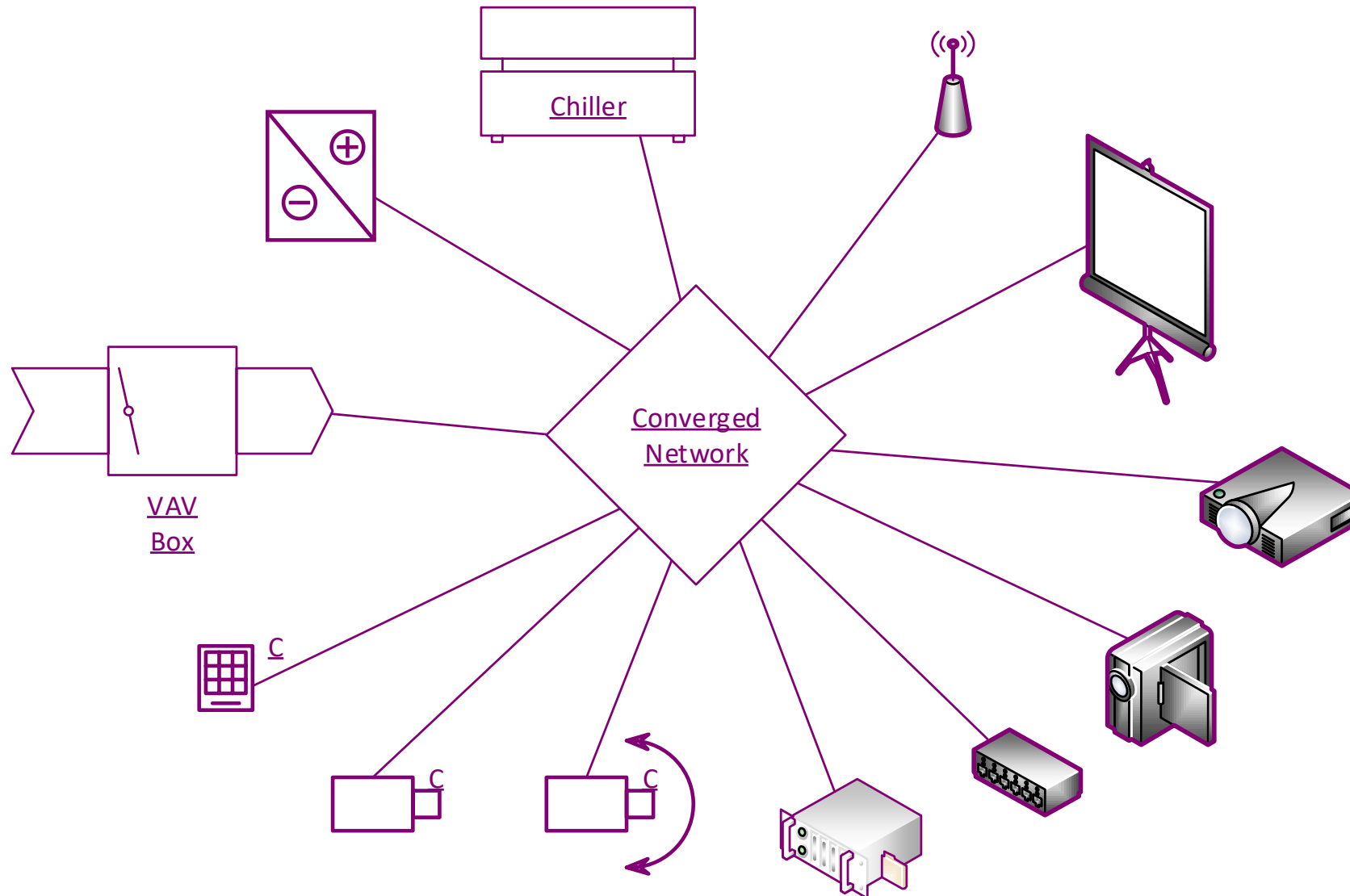
# TYPICAL BUILDING SYSTEMS



# INTEGRATED BUILDING SYSTEM



# CONVERGED NETWORK





# HMA'S SMART BUILDING RATING SYSTEM



Simple building controls with unitary or compartmental control



Direct digital control, central monitoring, local energy optimization



Comprehensive building management system with global energy optimization and integration to HVAC equipment, lighting control, power meters, etc.



Above w/ integration to other building systems such as security, parking revenue, and/or parking guidance. May have structured cabling systems.



Above w/ advanced operational strategies deployed to enhance user experience and assist operations staff. Typically deployed via structured cabling systems.

# HAVE A REASON TO INTEGRATE?

TO FROM		MEP SYSTEMS												SECURITY AND LIFE SAFETY SYSTEMS												Enterprise Systems			
		BMCS	EPS	FMS	PQMS	UPS	PDU	LCS	VSD	WCU	TMS	LDS	RLD	MLI	ACMS	CCTV	NVR	VMS	SIS	EIS	FAS	MNS	ECS	VBS	PCS	CMMS	DSS	MRS	APP
MEP SYSTEMS	BMCS																												X
	EPS	X																											
	FMS		X																										
	PQMS	X	X																										
	UPS	X																											
	PDU																												X
	LCS	X																											
	VSD	X																											
	WCU	X		X																									
	TMS																												
	LDS				X																								
	RLD																												
	MLI																												
SECURITY & LIFE SAFETY SYSTEMS	ACMS														X				X								X		
	CCTV														X	X					X								
	NVR														X		X		X										
	VMS					X									X	X		X											
	SIS														X														
	EIS																						X				X		
	FAS																												
	MNS																												
	ECS																												
	VBS					X																							
	PCS																												
ENTERPRISE SYSTEMS	CMMS	X		X																									
	DSS																												
	MRS			X																									
	APP																												

BMCS	- Bldg Mgmt & Control System
EPS	- Emergency Power System
FMS	- Fuel Monitoring System
PQMS	- Power Quality Monitoring System
UPS	- Uninterruptible Power Supply
PDU	- Power Distribution System

LCS	- Lighting Control System
VSD	- Variable Speed Drive Units
WCU	- Water Chilling Units
TMS	- Thermal Metering System
LDS	- Leak Detection System
RLD	- Refrigerant Leak Detection
MLI	- ML Phase I BMCS

ACMS	- Access Control Mgmt System
CCTV	- Closed Circuit Television
NVR	- Network Video Recording
VMS	- Visitor Mgmt System
SIS	- Security Intercom System
EIS	- Emergency Intercom System

FAS	- Fire Alarm System
MNS	- Mass Notification System
ECS	- Elevator Control & Monitoring System
VBS	- Visitor Badging System
PCS	- Parking Control System

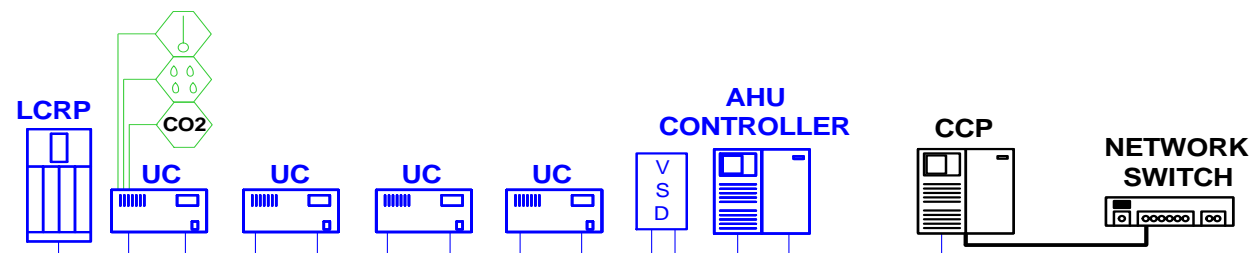
CMMS	- Computerized Maintenance Management System
DSS	- Digital Signage System
MRS	- Meeting Room Reservation System
APP	- Building Smartphone App

# BMCS TOPOLOGIES



# BMCS FLOOR ARCHITECTURE - PAST 15 YEARS

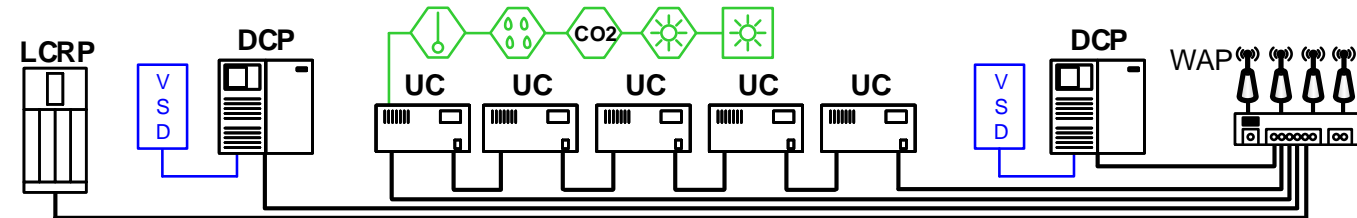
TYPICAL FLOOR



- CATEGORY 6 CABLING
- BACNET MS/TP
- ANALOG INPUTS

# BMCS FLOOR ARCHITECTURE - ALL IP

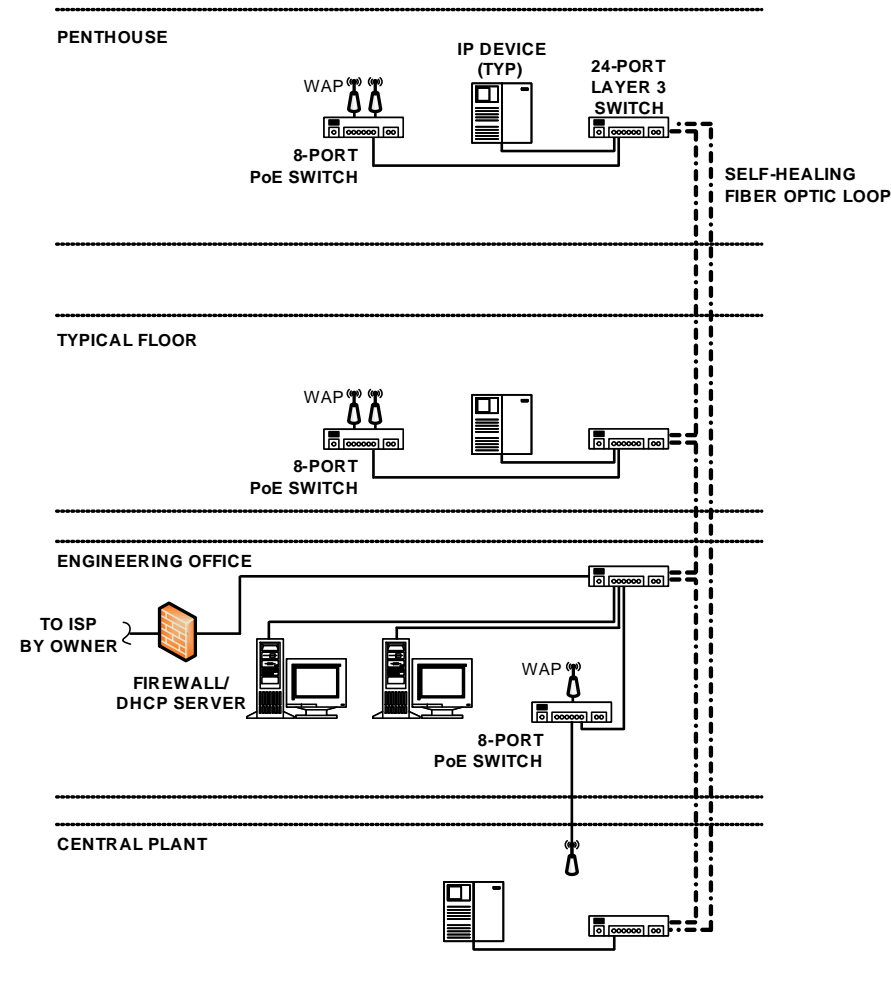
TYPICAL FLOOR – SELF-HEALING ETHERNET LOOP TO UC



- CATEGORY 6 CABLING
- BACNET MS/TP
- COMMUNICATIONS BUS



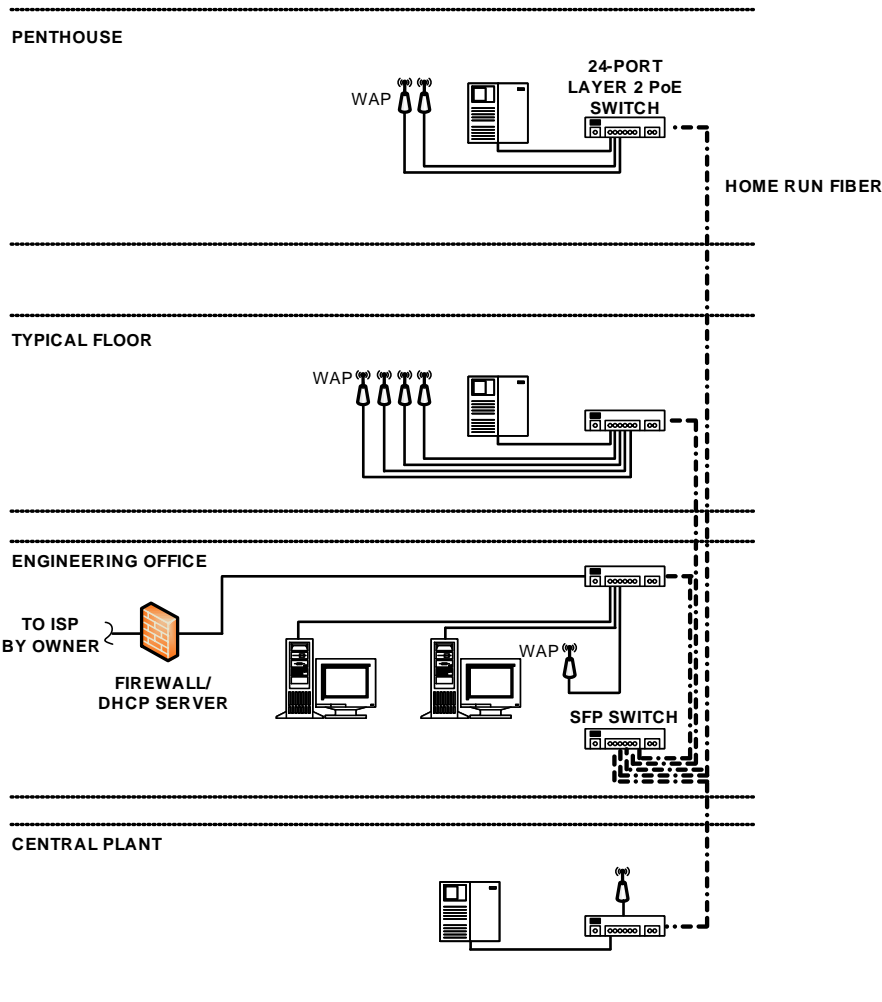
# LAYER 2 VS LAYER 3 IP NETWORK



**BMCS ARCHITECTURE SCHEMATIC**

**LAYER 3**

----- FIBER OPTIC CABLING  
—— CATEGORY 6 CABLING



**BMCS ARCHITECTURE SCHEMATIC**

**LAYER 2**

# PROCUREMENT OPTIONS

- ◉ Third party IT contractor
- ◉ BMCS subcontractor
- ◉ Security subcontractor

# TENANT & OPERATIONAL TECHNOLOGY NEEDS



# BUILDING DASHBOARDS



**LucidMeetings**

Dashboard Meetings Action Items

All times are shown in your preferred timezone, America/Los Angeles. [Change](#)

Today's Meetings

4am - 4:55am	Introduction to Lucid Meetings
3:30pm - 4:25pm	Meeting to Discuss SEO

Your Open Action Items

You do not have any open action items.

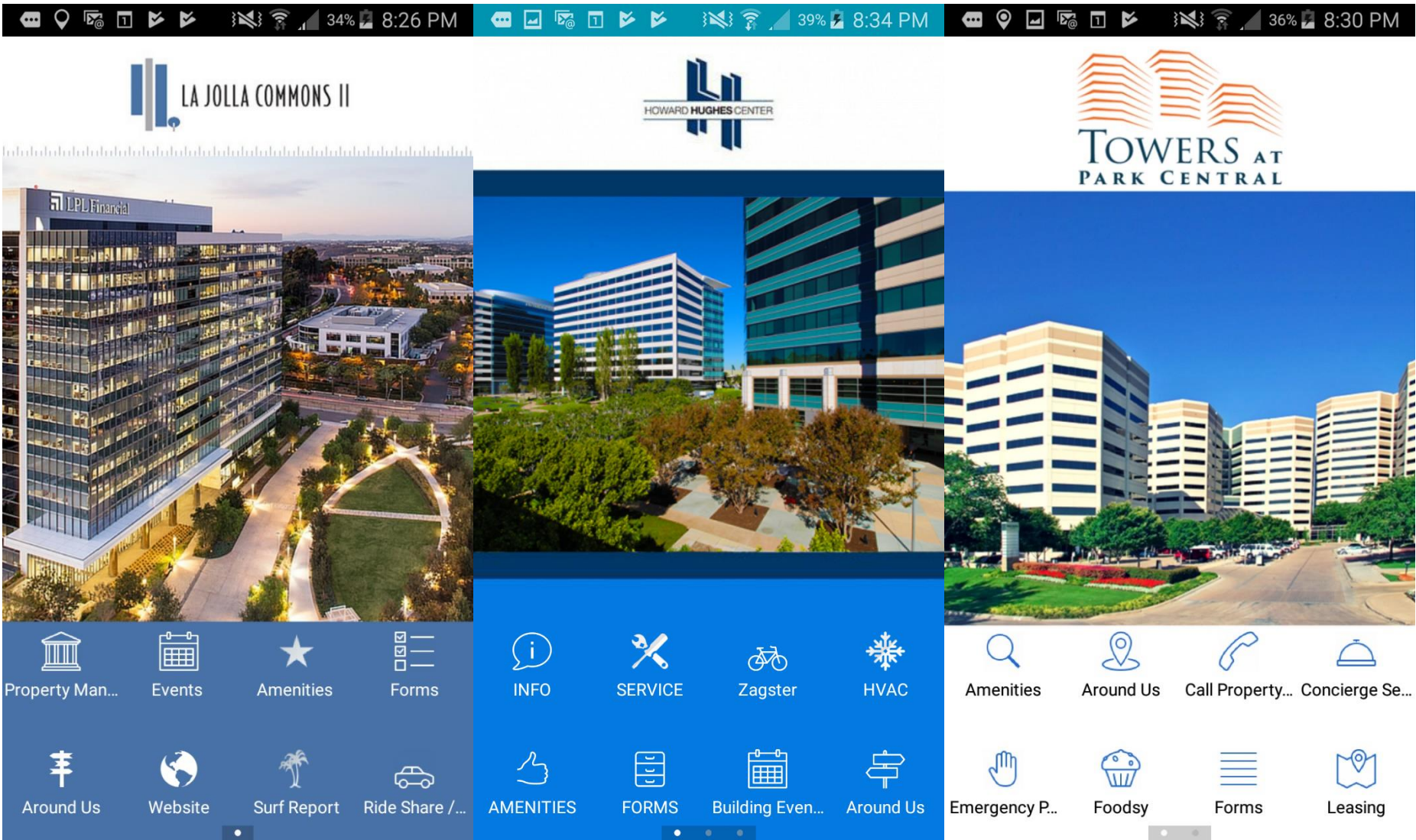




# BUILDING MOBILE APPS

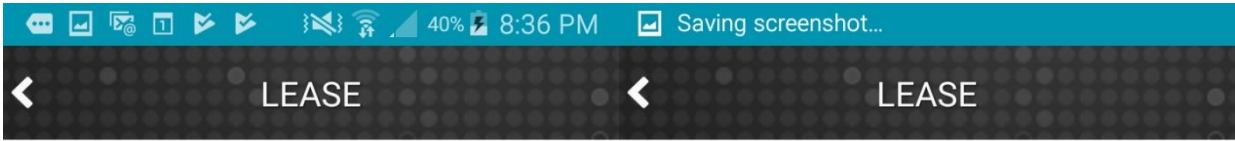


# BUILDING MOBILE APPS






# BUILDING VIRTUAL TOURS



# AFTER HOURS HVAC CONTROL

37% 8:32 PM


After Hours HVAC Re... 

39% 8:35 PM


HVAC

40% 8:37 PM

AC



After Hours HVAC Request- Park Central 789  
12790 Merit Dr., Suite 110, Dallas, TX 75251 | 972-770-4000

Date:  
 /  /    
MM DD YYYY


Tenant :


Building:

Suite :

Floor(s) Requested

1.


Date HVAC Required:  
 /  /  



User Name


Password

☒ Remember Me

 Login

[Forgot Password?](#)


For Customer Support  
please call [866-935-1557](tel:866-935-1557)  
or email us at [Support@GetGenea.com](mailto:Support@GetGenea.com)



User Name

Password

☒ Remember Me

 Login

[Forgot Password?](#)

For Customer Support  
please call [866-935-1557](tel:866-935-1557)  
or email us at [Support@GetGenea.com](mailto:Support@GetGenea.com)



# CONFERENCE ROOM SCHEDULING

Conference Center Re...

# Conference Center Reservation- Park Central 789

12790 Merit Dr., Suite 110, Dallas, TX 75251 | 972-770-4000

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Tenant:

Start Date:

/  /

MMDDYYYY

End Date:

/  /

MMDDYYYY

Start Time:

:: AM ▼

HHMMSSAM/PM

End Time:

:: AM ▼

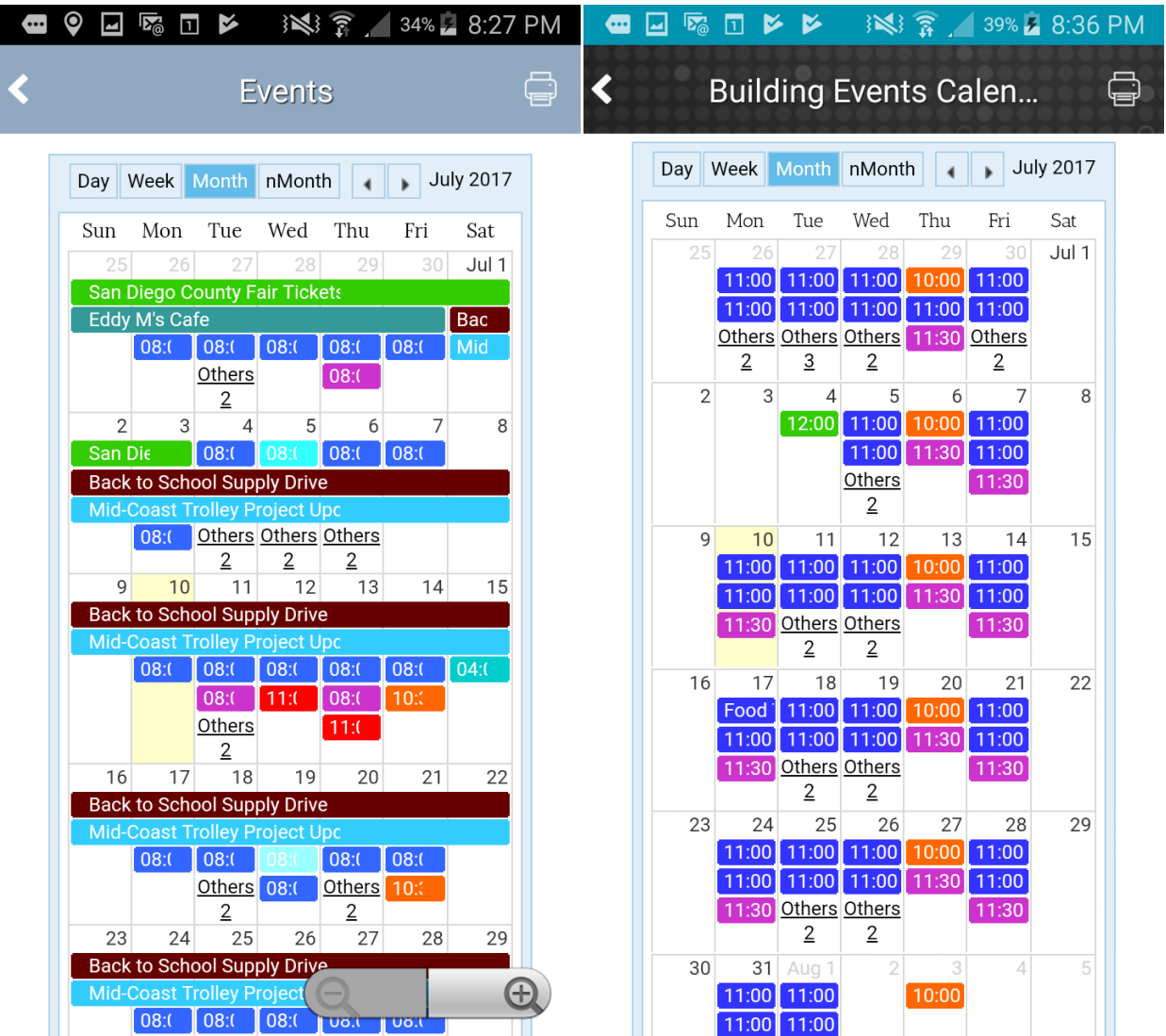
HHMMSSAM/PM

## Conference Room License Agreement on File:

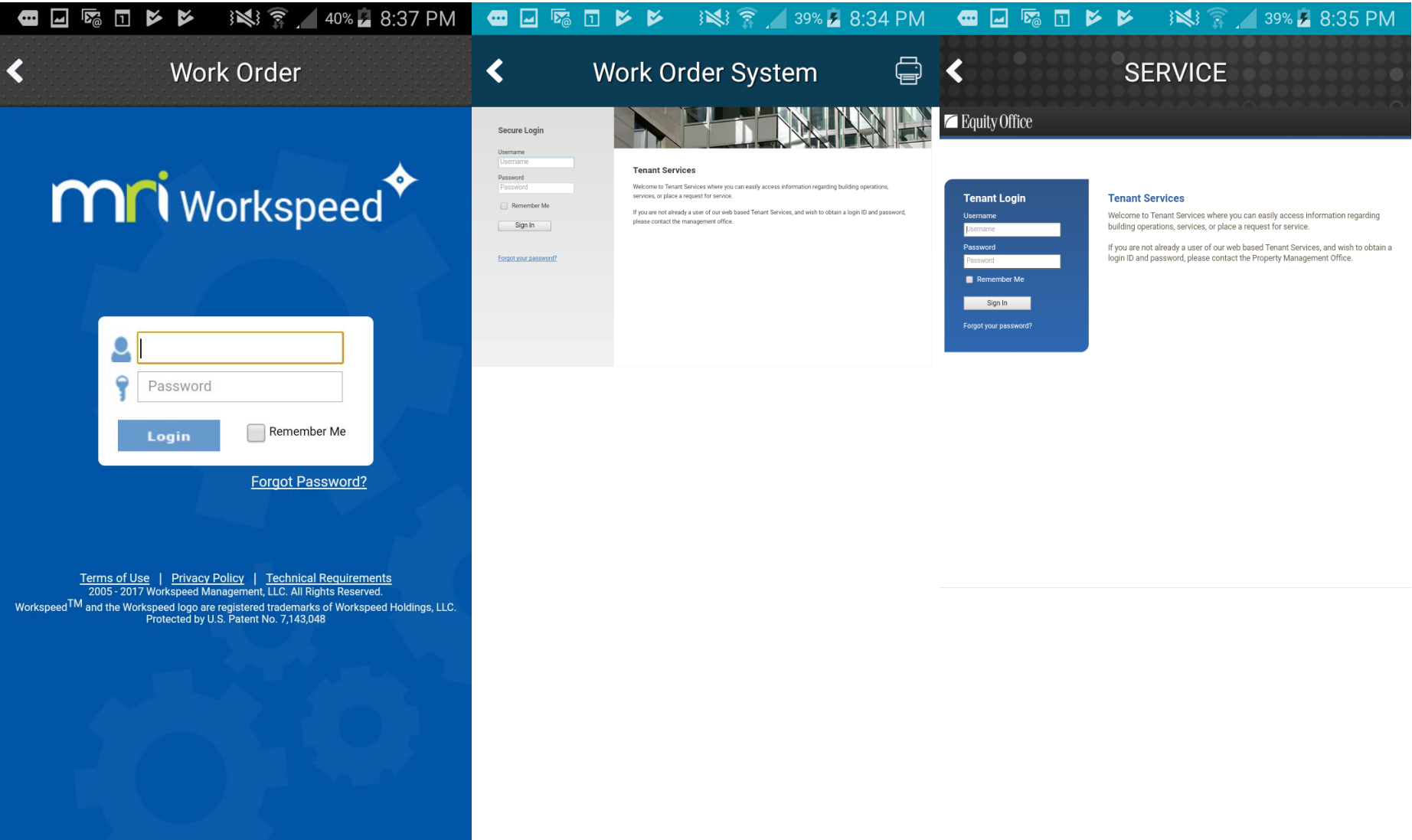
☐ Yes

☐ No

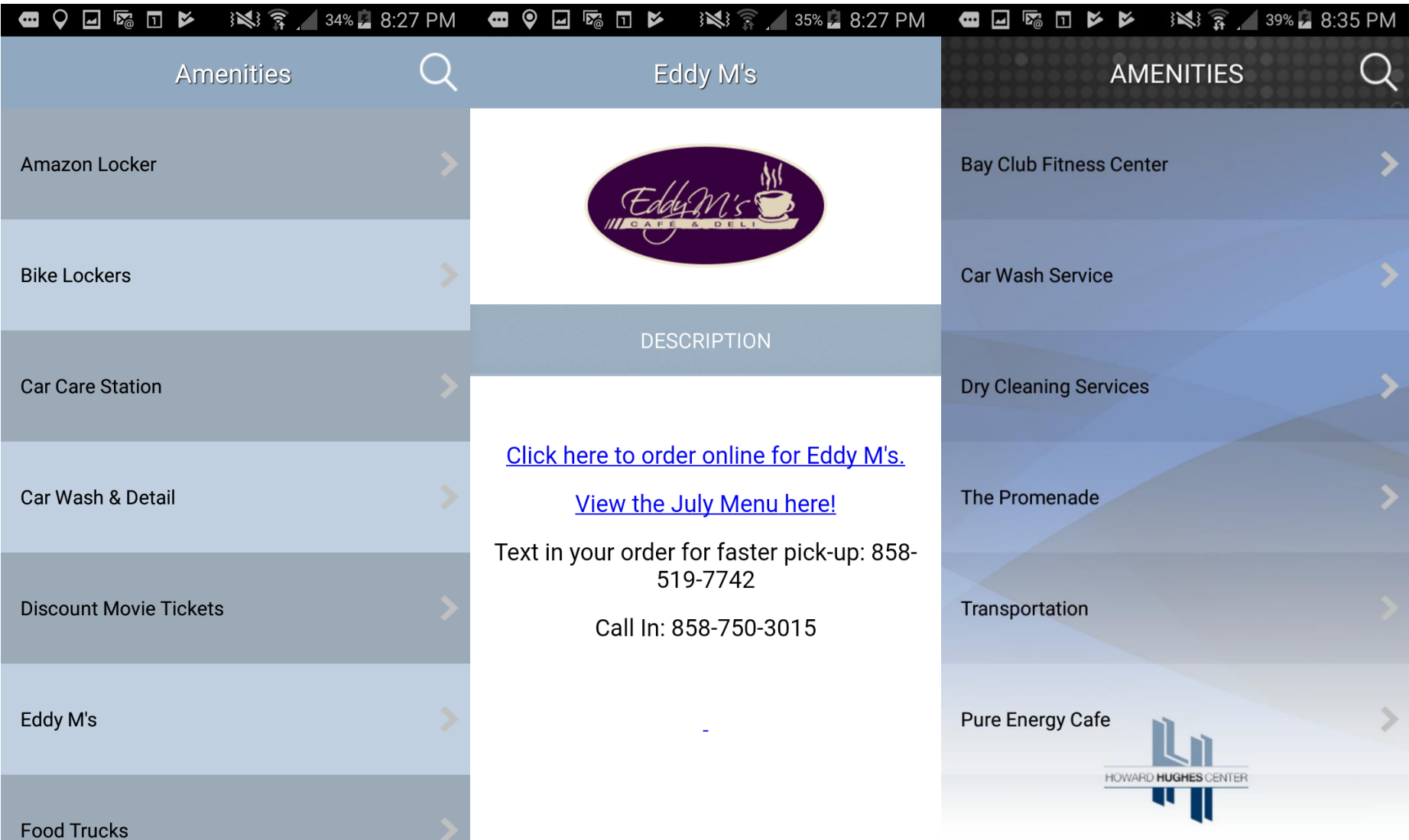
# BUILDING EVENT CALENDAR



# TENANT WORK ORDERS



# BUILDING AMENITIES





# TENANT FORMS

Forms

Access Card Request

Emergency Procedures

Access Card Request

After Hours HVAC Request

Bicycle Storage Waiver & Release

Certificate of Liability Insurance

Conference Center Reservation

Directory & Suite Signage Request

Fitness Center Waiver & Release

Access Card Request- Park Central 789

12790 Merit Dr., Suite 110, Dallas, TX 75251  
972-770-4000

Name:

FirstLast

Phone Number:

-

-

##########

Company and Suite Number:

Please Check Mark Your Requested Access

Garage:

☐ 7

☐ 8

Introduction-Phone Numbers

Tenant Awareness Program

Media Response Guidelines

What do you do if you discover a fire or smoke in the building


Emergency Procedures Plan

Fire Safety Plan

Typical Fire Alarm Operation

# LEASING INFORMATION

Leasing



Leasing Agents

Available Space


Brochure

Property Management

thinkBIG

US BANK TOWER

Leasing



MENU

## GREEN INITIATIVES

- Energy Star Performance Ratings of 87+

- Environmental Tobacco Smoke (ETS) control

- Green cleaning

- Single-stream recycling

- Motion-sensor lighting

- Building Automation System (BAS)

- Alternative commuting


- Green landscaping practices

- Electric Vehicle (EV) charging stations

- Green pest control


- Electronics recycling

Tenant Services



MENU

## TENANT RESOURCES

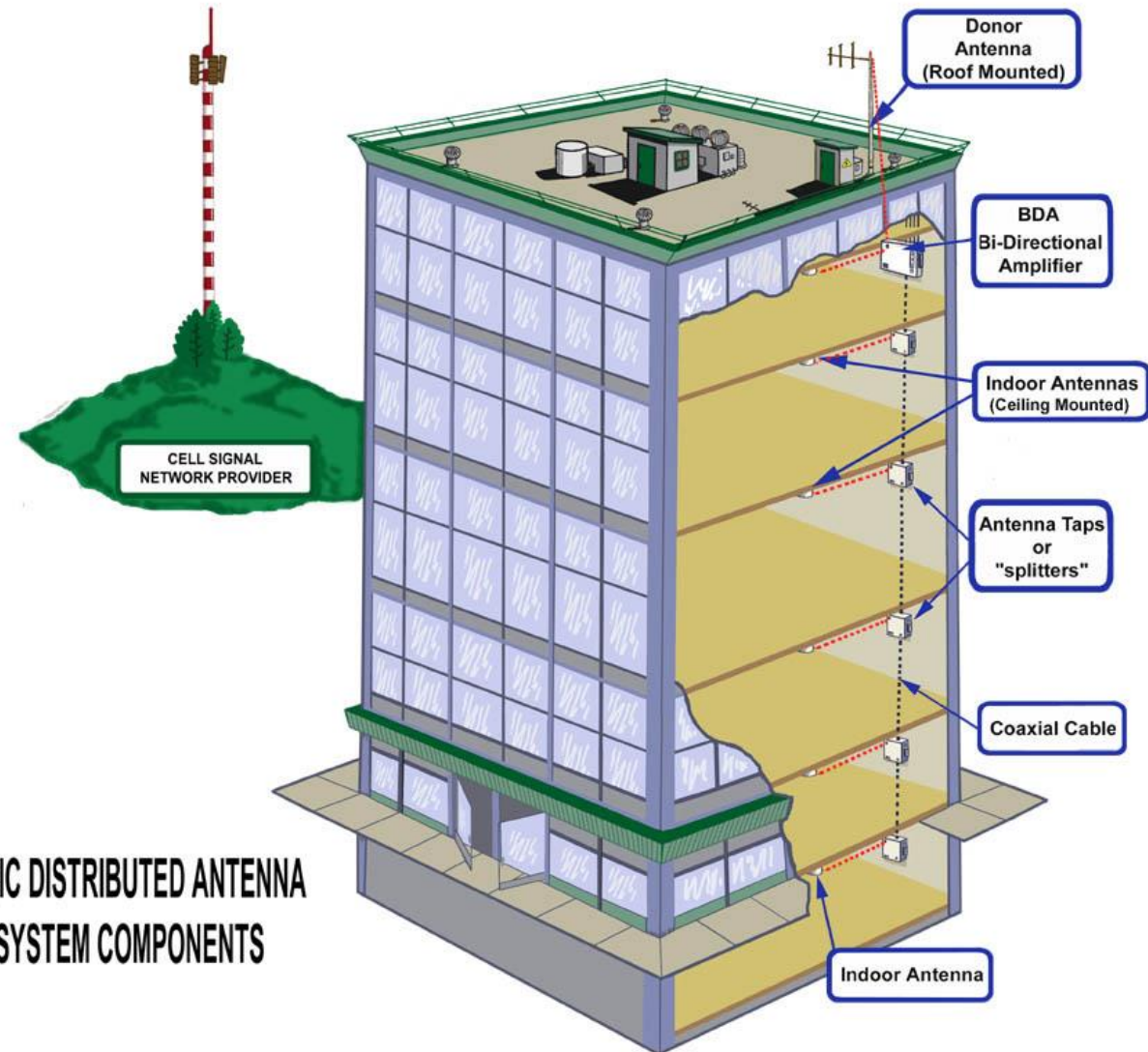
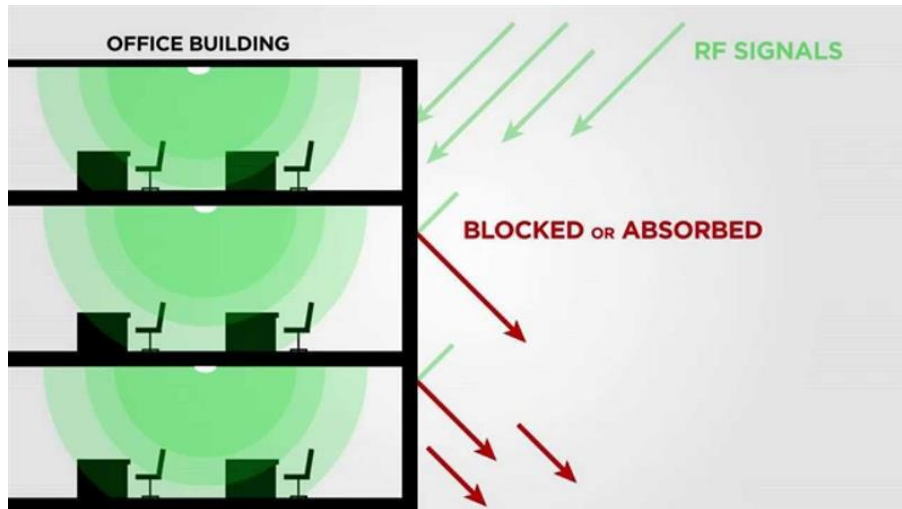


# DISTRIBUTED ANTENNAE SYSTEMS





# CELLULAR DAS



BASIC DISTRIBUTED ANTENNA  
SYSTEM COMPONENTS

# PARKING SYSTEMS





# PARKING SYSTEMS

- ◉ Contract Parking
- ◉ Revenue Systems
- ◉ Credential Technologies
- ◉ Parking Guidance Solutions

# CONTRACT PARKING



# CONTRACT PARKING DATABASE MANAGEMENT



- ◉ Cardreaders interface to Parking Revenue System
  - Common for parking with third party management company.
  - Two database for building and garage.
  
- ◉ Cardreaders interface to Access Control System
  - Single database for building and garage.
  - Common for parking managed by property management.

# CONTRACT PARKING CREDENTIALS

## Toll-tag



## Cellphone Barcode



## License Plate Recognition



## Cellphone Bluetooth



# AUTOMATIC VEHICLE IDENTIFICATION (AVI)

- ◉ Can utilize a AVI tag issued by the Toll Authority for Independent Parking Systems depending on location.
- ◉ Some Toll Authorities do not allow their card format to be read by other systems.
- ◉ Multiple AVI tags on a vehicle can cause interference and typically require a minimum distance between the AVI tags.





# AVI TAGS

## Passive Tags

Uses signal from reader to energize tag.



## Active Tags

Utilize internal battery.



## License Plate Tags

- Utilized for vehicles for metal in windshield.



# LICENSE PLATE RECOGNITION

- ◉ Utilize camera based technology to read license plates.
- ◉ Parking Revenue Systems are incorporating LPR.
- ◉ Common issues with LPR are:
  - Location for mounting camera.
  - License plate requirements vary state to state.
  - Height of license plates.
  - License plate covers.



# CELLPHONE BARCODE

- ⦿ Not secure, anybody could capture the bar code (photo, print, etc.) to gain access.
- ⦿ Typically slower as users have to open bar code on phone.



# BLUETOOTH COMMUNICATION

- ◉ User downloads mobile app and credential is issued to them.
- ◉ Slightly more expensive than an access card.
- ◉ Typically slower.



# PARKING REVENUE SYSTEMS





# PARKING REVENUE SYSTEMS

- ◉ Future credit card processing standards will require cardholder to maintain possession of credit card at all times.
- ◉ Parking revenue equipment is now TCP/IP based with controllers within equipment.
- ◉ Onsite and Cloud solutions available.



# VISITOR ENTRY/EXIT CONFIGURATIONS

## ◉ Entry Stations:

- Ticket Dispensers
- Credit Card In
- Bar Code Reader (ticket, cell phone, paper print out)

## ◉ Pay on Foot Stations:

- Credit Card Only, add Cash, add Coin

## ◉ Exit Stations:

- Bar Code Reader only, add Credit Card, add Cash, add Coin



# VALIDATION

- ◉ Pre-purchased validation tickets.
- ◉ Validation tickets purchased at time of printing.
- ◉ Web based validation through Web Browser.
- ◉ Network based validation scanner.
- ◉ Software based validation with USB scanner.
- ◉ Mobile App.

# PARKING GUIDANCE SOLUTIONS

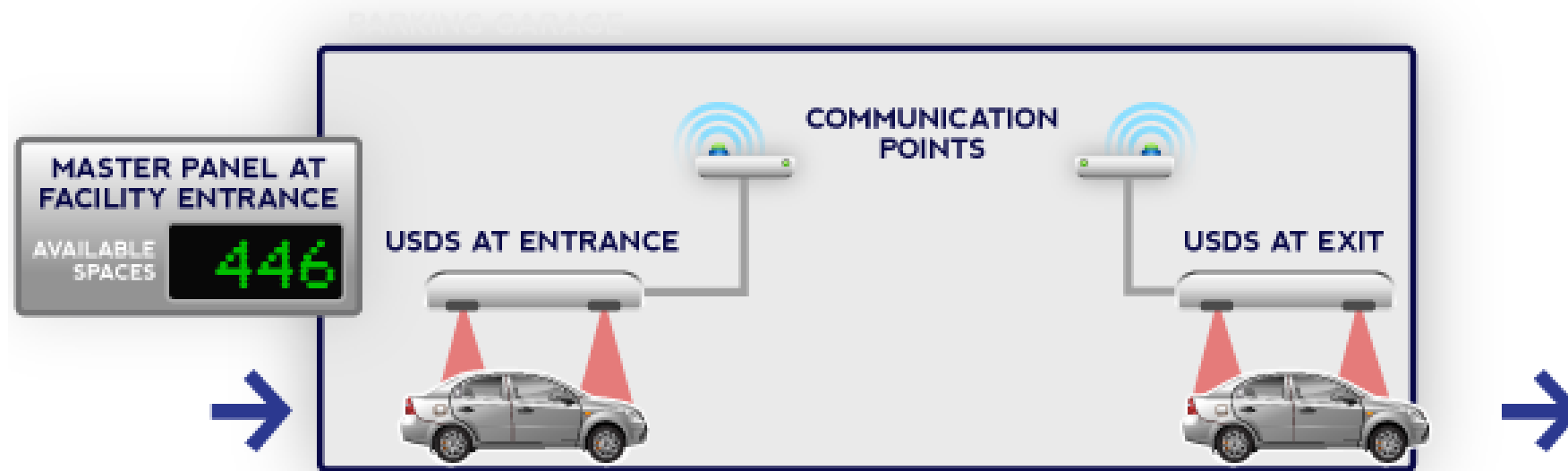


# PARKING GUIDANCE SOLUTIONS

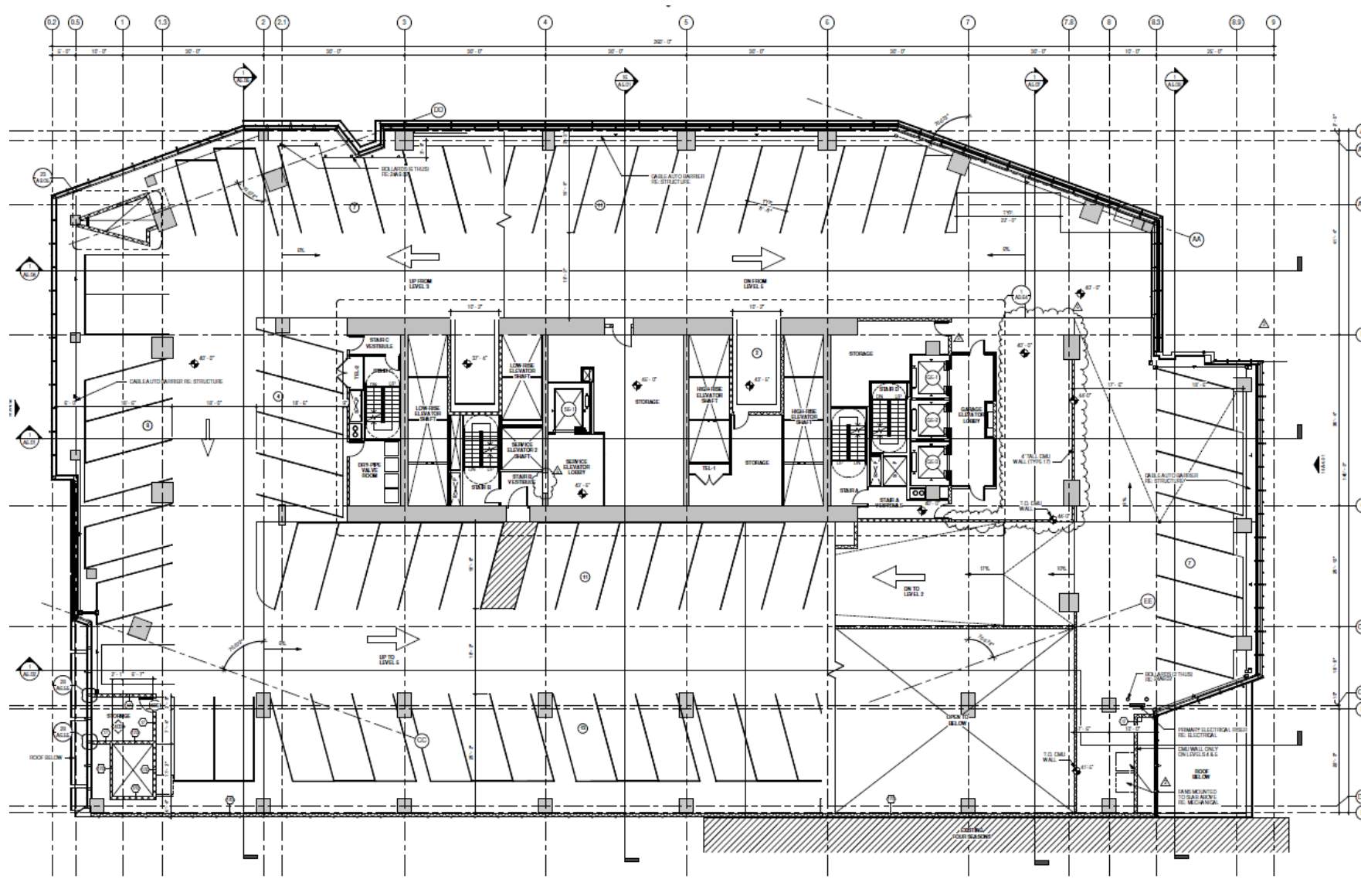
- ◉ Facility Counting
- ◉ Level Counting
- ◉ Single Space Monitoring
- ◉ Way Finding



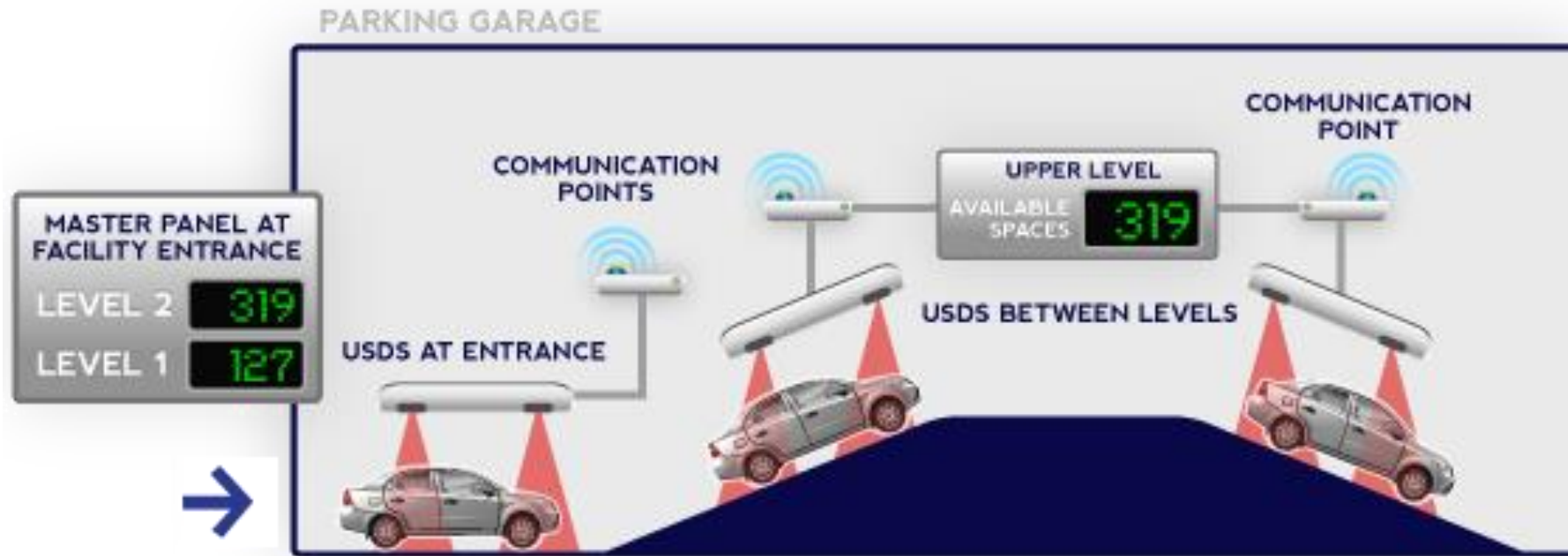
# FACILITY COUNTING



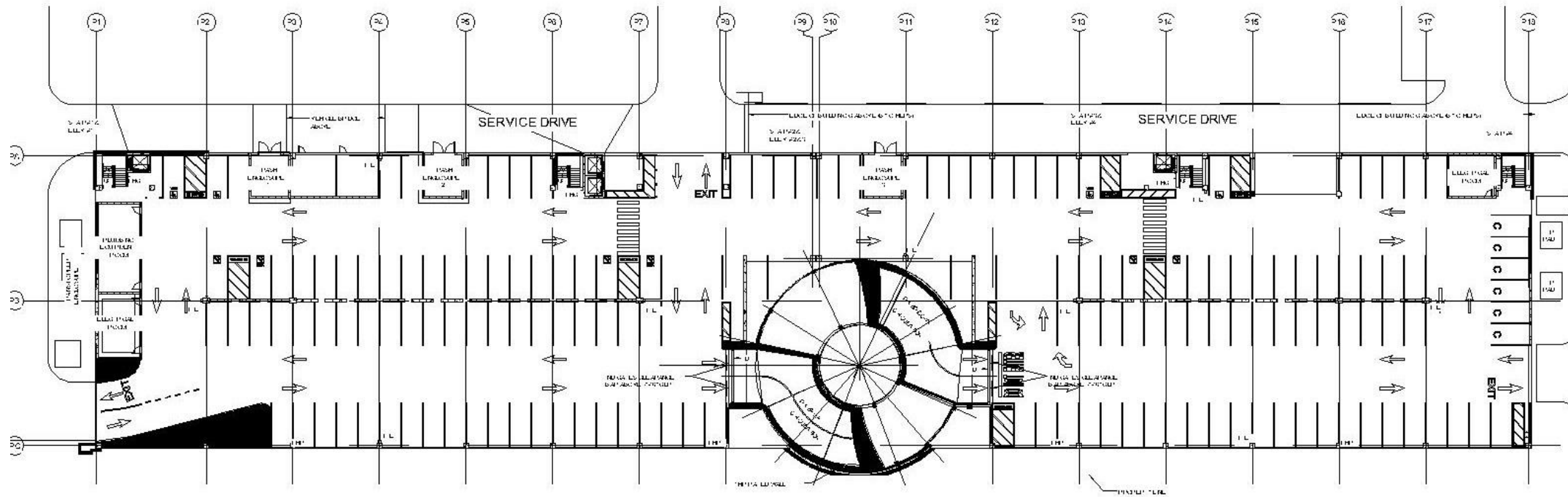
- ◉ Counts vehicles entering and exiting garage.
- ◉ Displays available space counts on signage at garage entries.
- ◉ Common technologies: Inductive Loop, Ultrasonic, Camera Based

[illegible]

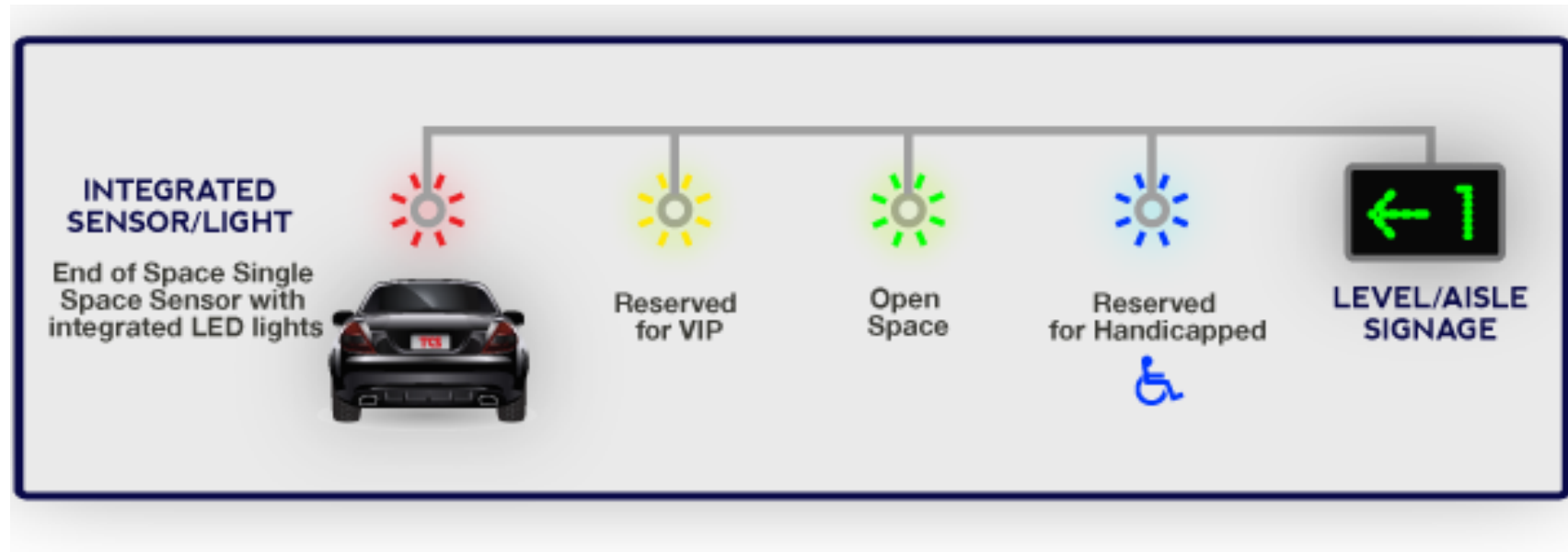
# LEVEL COUNTING



- Counts vehicles entering and exiting each garage level.
- Typically displays available space counts on signage at garage entries and each level.
- Common technologies: Inductive Loop, Ultrasonic, Camera Based

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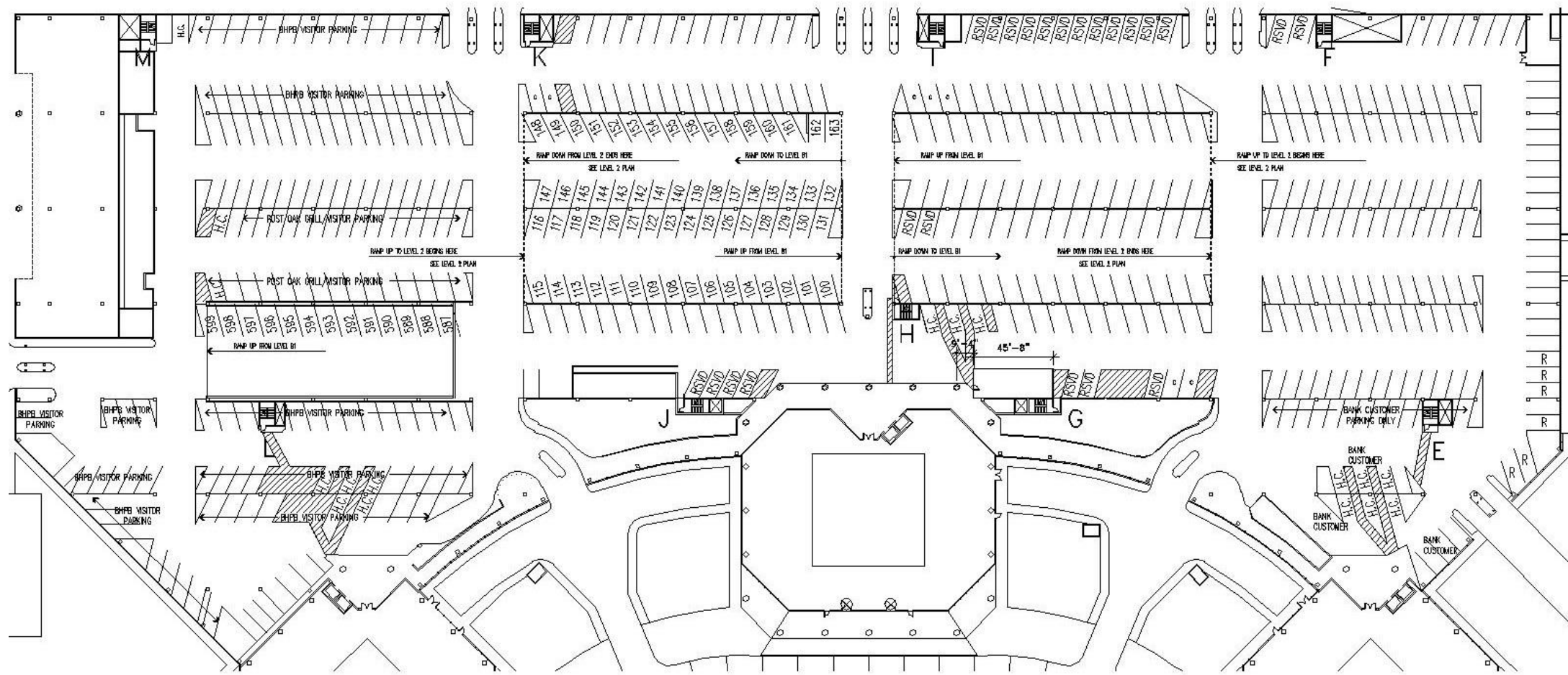
# SINGLE SPACE COUNTING



- ◉ Counts available spaces via sensors monitoring each parking space.
- ◉ Typically displays available space counts on signage at garage entries and each level. Also can display available spaces for a row in a garage.
- ◉ Higher accuracy.
- ◉ Common technologies: Ultrasonic or Camera Based

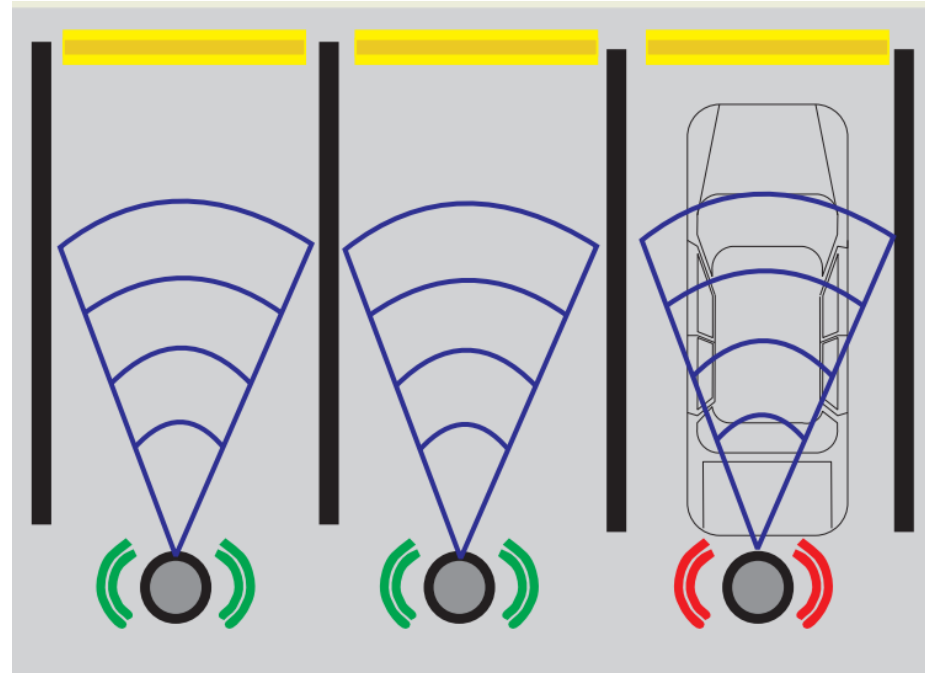


# SINGLE SPACE COUNTING



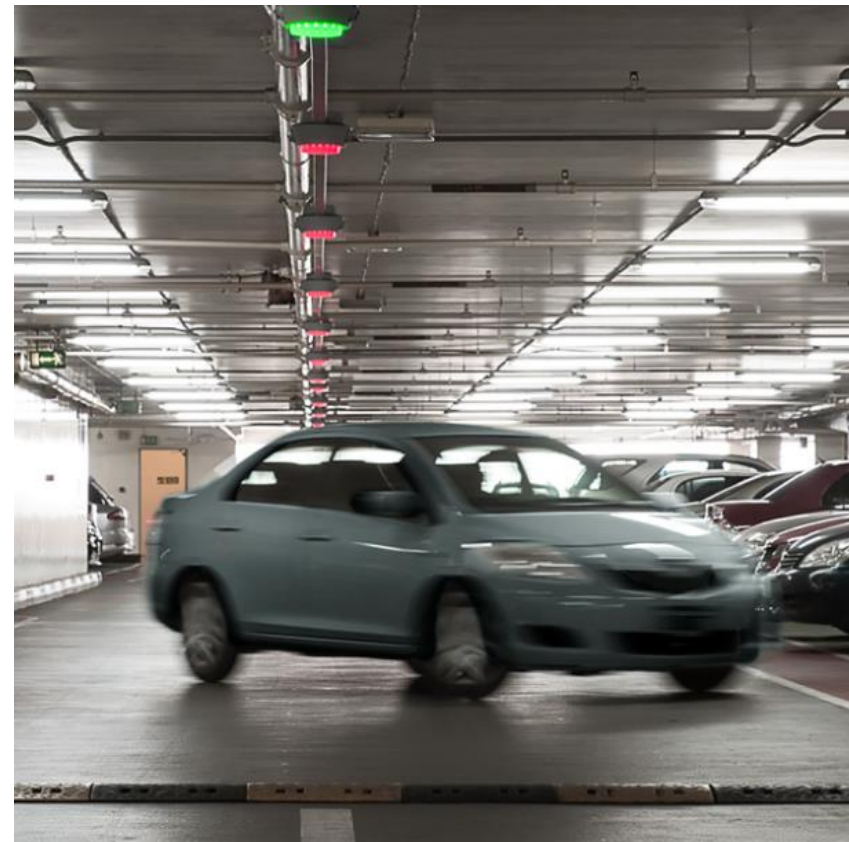
# ULTRASONIC SINGLE SPACE COUNTING

- ◉ Ultrasonic sensor and indicator light at each parking space.
- ◉ Initial technology for single space counting.



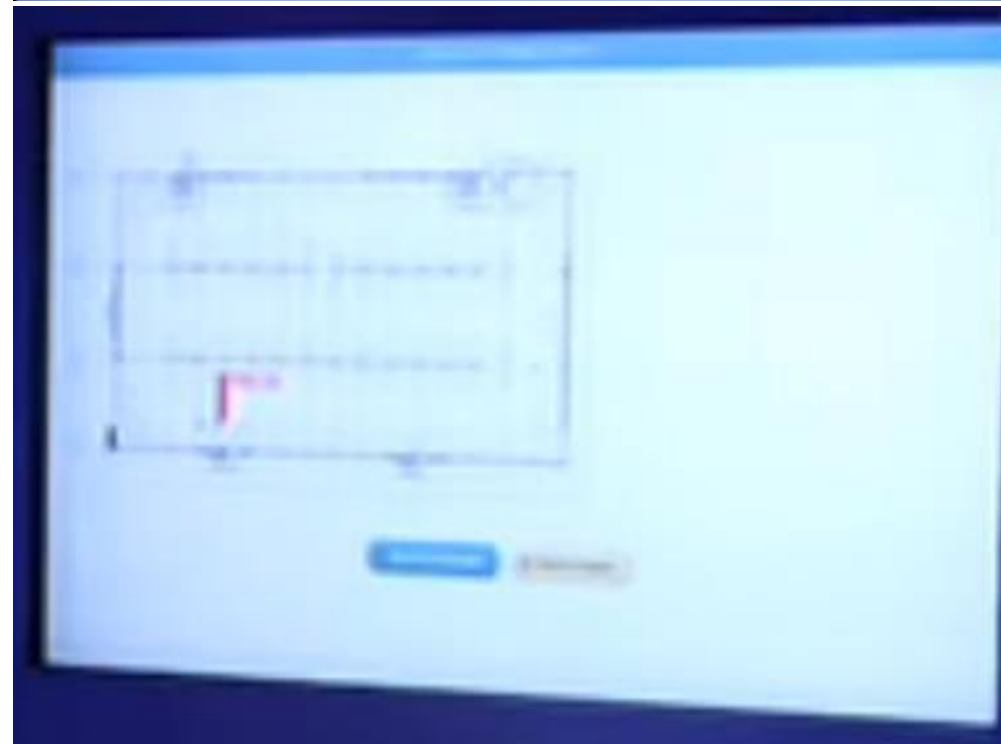
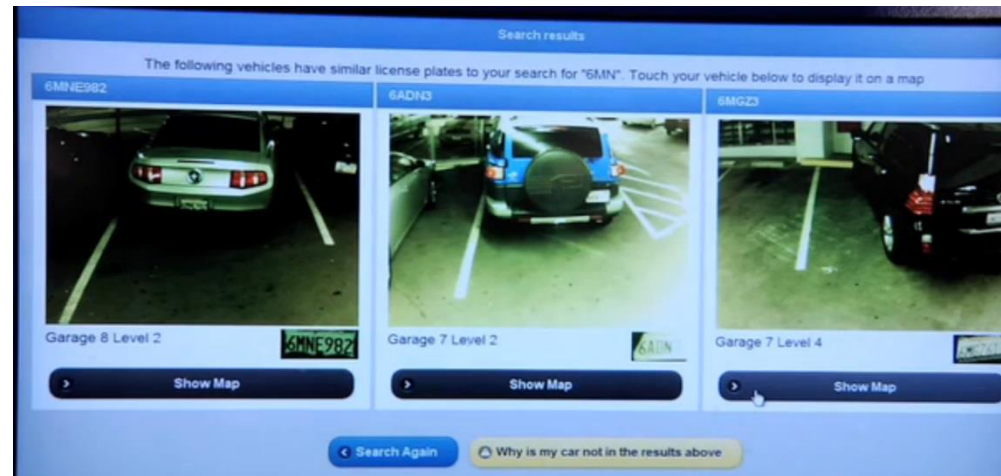
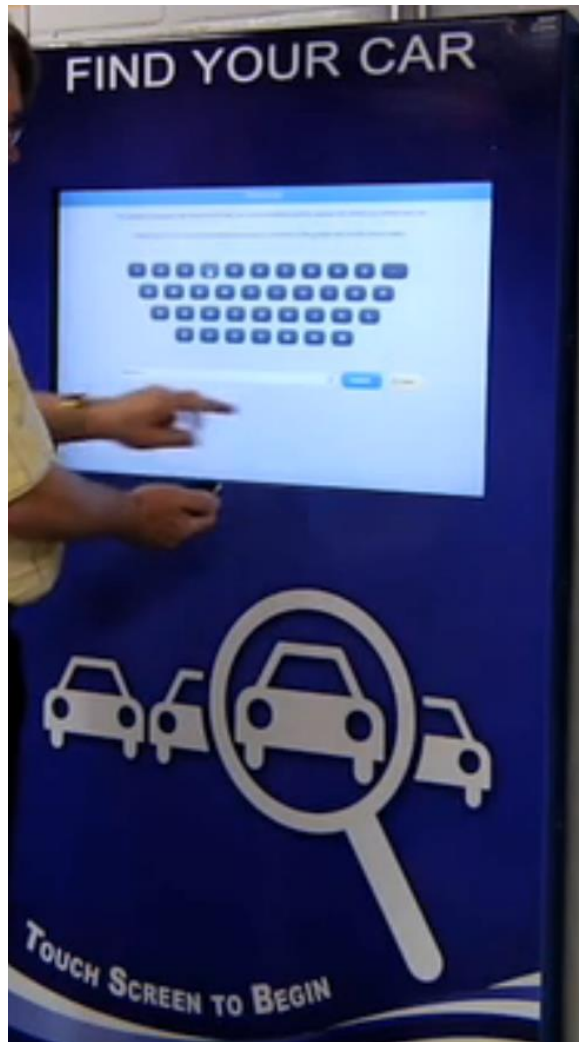
# CAMERA BASED SINGLE SPACE COUNTING

- ◉ Up to two cameras per sensor monitoring both sides of drive lanes.
- ◉ Camera technology allows for additional features.

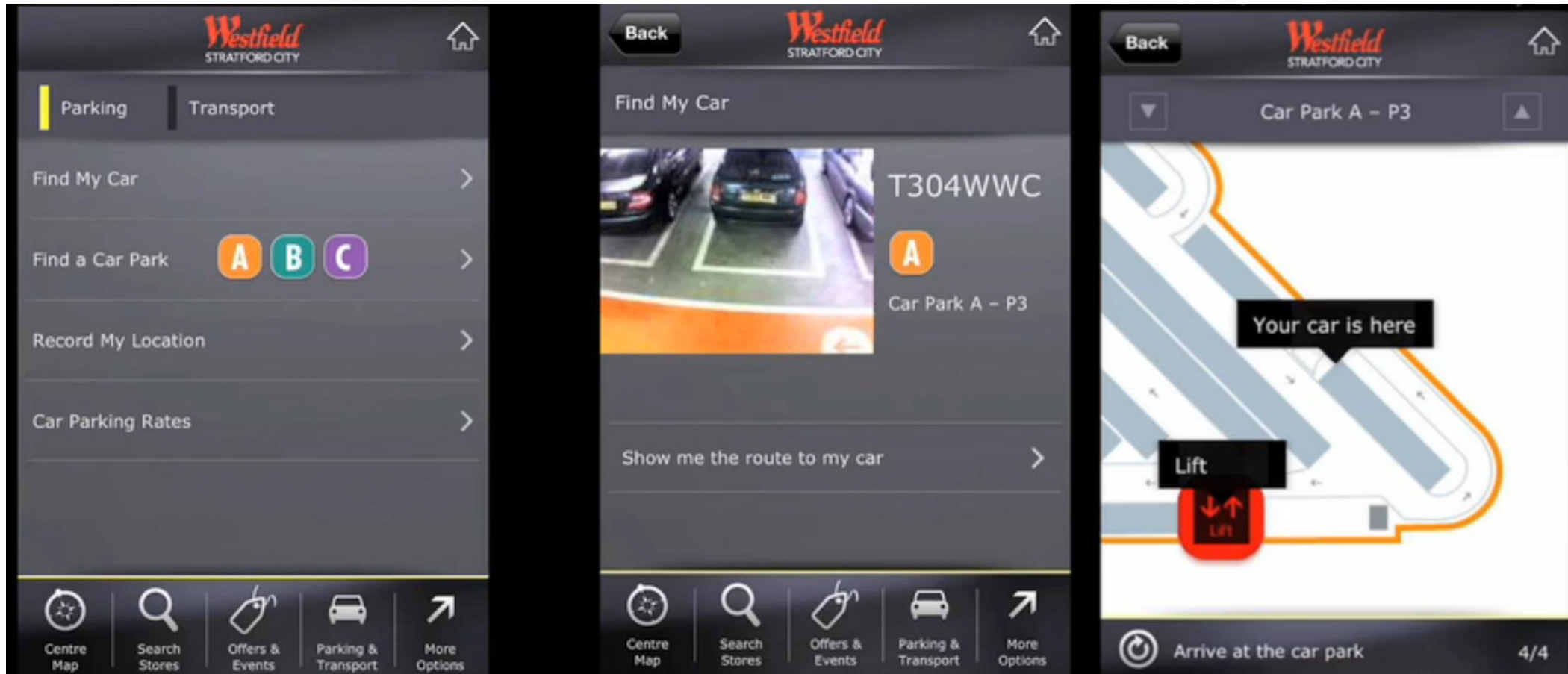




# VEHICLE LOCATOR KIOSKS



# VEHICLE LOCATOR MOBILE APP

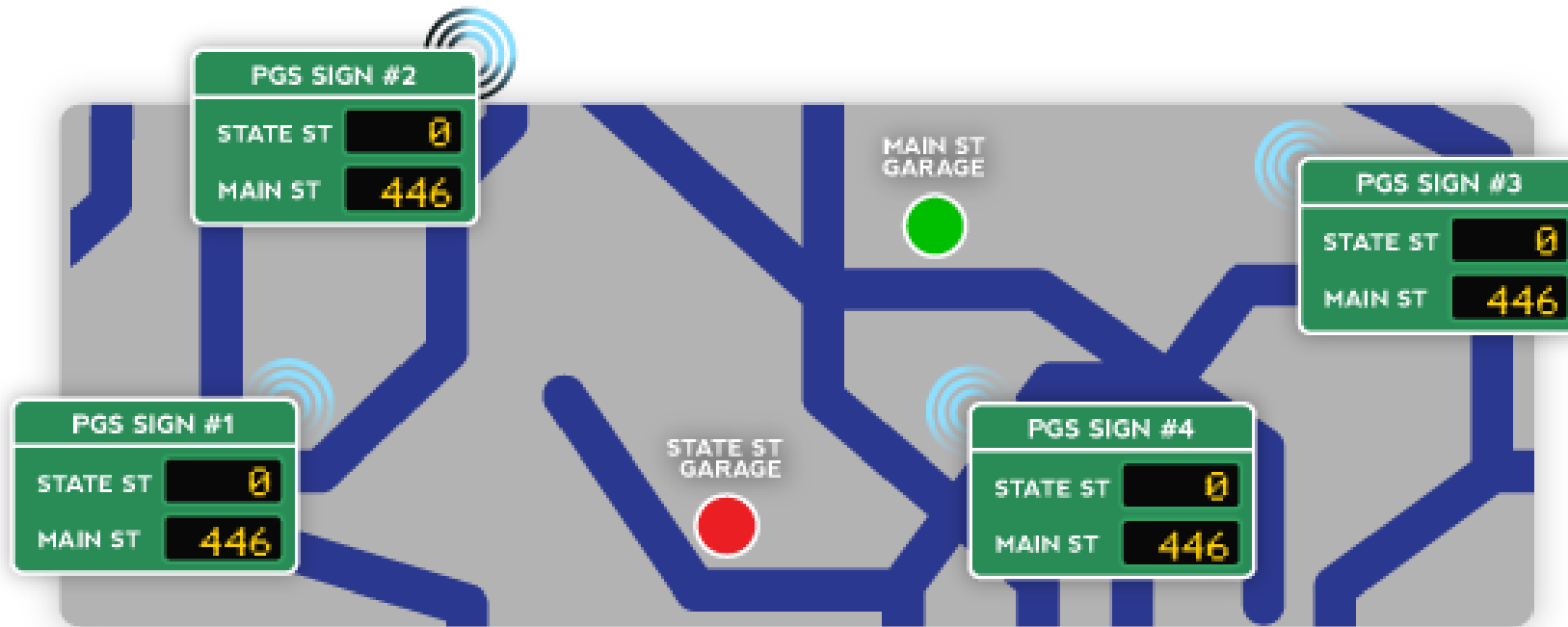




# VARY PARKING RATES



# WAY FINDING



- ◉ Utilizes Facility Counting Systems for multiple garages.
- ◉ Utilizes signage at multiple locations.
- ◉ Typically located near Convention Centers or Sports Venues to direct patrons to garages owned/managed by the same company.

# ABOUT HMA



# HMA CONSULTING SERVICES

- ◉ Security
- ◉ Building Automation
- ◉ Fire Alarm
- ◉ Information Technology
- ◉ Audio Visual
- ◉ Intelligent and Integrated Systems
- ◉ Structured Cabling
- ◉ Paging Systems



# PROJECT PORTFOLIO

- ◉ Corporate Headquarters
- ◉ Airports
- ◉ Athletic and Recreational Centers
- ◉ High Rise Office Buildings
- ◉ Research and Laboratory
- ◉ Computing and Data Centers
- ◉ Correctional and Custodial Facilities
- ◉ Professional/Collegiate Sports Facilities
- ◉ Banking and Financial Centers
- ◉ Convention and Assembly
- ◉ Retail Shopping Centers
- ◉ Hospitals and Health Centers
- ◉ Telecommunication Service Centers
- ◉ Industrial Environments
- ◉ Office Parks
- ◉ Educational Establishments and Campus Facilities
- ◉ Agricultural Research Centers
- ◉ Television & Satellite Broadcast Centers
- ◉ Parking Facilities
- ◉ Courthouse/Law Enforcement Facilities
- ◉ Generation Facilities
- ◉ Transportation Centers



# REFERENCES

- ◉ <http://kai-dbi.com/ibms.php#prettyPhoto>
- ◉ <http://www.tcsintl.com/>
- ◉ <http://www.parkassist.com/index.php/home/>
- ◉ <http://www.hidglobal.com/products/readers/iclass-se/smart-card-readers>
- ◉ <https://uk.westfield.com/stratfordcity/services/all-services/the-westfield-app/708>
- ◉ Howard Hughes Center Mobile App
- ◉ La Jolla Commons Phase II Mobile App
- ◉ Towers at Park Central Mobile App
- ◉ US Bank Tower Mobile App