

# Just What the Doctor Ordered: How Health Care Facilities Depend on Smart Infrastructure & Smart Planning

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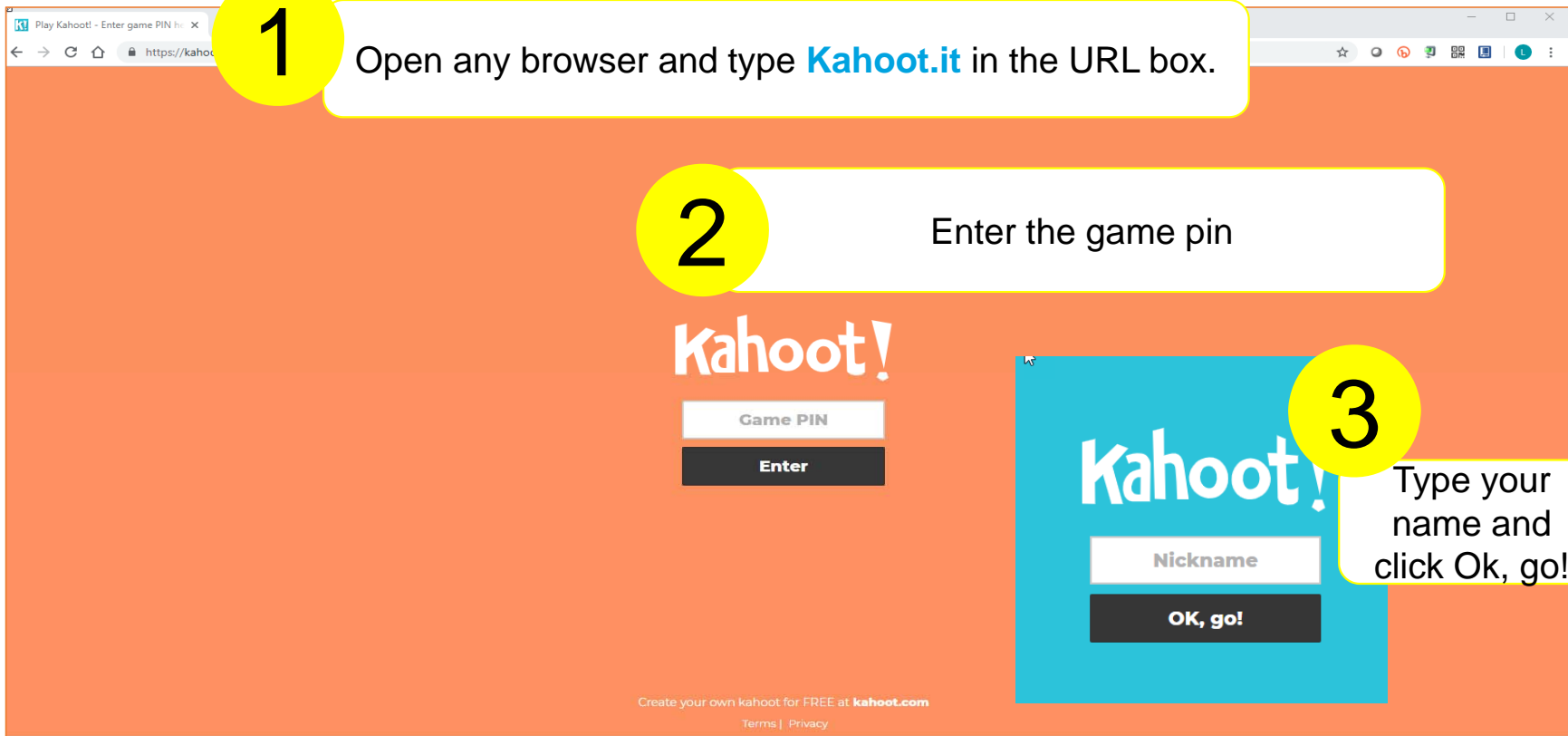
Chatsworth Products



# Agenda

- ✓ An earthquake, building codes, & AHJ
  - ✓ Recent example in CA
- ✓ Growing List of Technologies in Hospitals & some examples to create resiliency
- ✓ Highlight specific areas of current standards
  - **TIA 1179-A, 6.5 Telecommunications Rooms**
  - ANSI/BICSI 004-2018
- ✓ Anchoring racks & cabinets using OPMs
- ✓ Cable management

# Kahoot Instructions



1 Open any browser and type [Kahoot.it](https://kahoot.it) in the URL box.

2 Enter the game pin

3 Type your name and click Ok, go!

The screenshot shows the Kahoot! website interface. At the top, there is a navigation bar with the Kahoot! logo and a search bar. Below the navigation bar, there is a large orange banner with the text "Kahoot!" and "Enter the game pin". In the center, there is a form with a "Game PIN" input field and an "Enter" button. To the right, there is a blue box with the text "Kahoot!" and "Type your name and click Ok, go!". Below this box, there is a "Nickname" input field and an "OK, go!" button. At the bottom of the page, there is a footer with the text "Create your own kahoot for FREE at [kahoot.com](https://kahoot.com)" and "Terms | Privacy".

# Pop Quiz Question #1

- From the 2019 Hospital Construction Survey.

**What percentage of respondents incurred extra costs due to conflicting or improper code interpretations on construction projects within the past 3 years?**

- A. 25%
- B. 80%
- C. 45%
- D. 60%

## Slide 4

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- KLS4** I hid the kahoot quesitons, but feel free to delete if you don't need them anymore.  
Kallail, Lauren S., 8/2/2019
- CM9** ok  
Cohen, Mitch, 8/2/2019
- KLS11** I deleted the question you didn't want. I couldn't add healthcare to the last question due to number count and had to re-word all 3 to fit. Please mockplay to make sure it all works well.  
Kallail, Lauren S., 8/30/2019

## Pop Quiz Question #2

- From the 2019 Hospital Construction Survey.

**Respondents spent an average of \_\_\_% of construction funding on correcting compliance issues due to conflicting on improper code interpretations over the past 3 years.**

- A. 2.5%
- B. 25%
- C. 4.8%
- D. 10%

# Pop Quiz Question #3

- Per ANSI/BICSI 004-2018, what is the minimum floor dimensions for a TR (Telecommunications Room) KD [2]1 in a health care facility where AHJ (Authority Having Jurisdiction) requirements are not present.
  - A. 10' x 10'
  - B. 20' x 20'
  - C. 12' x 14'
  - D. 8' x 16'

**Slide 6**

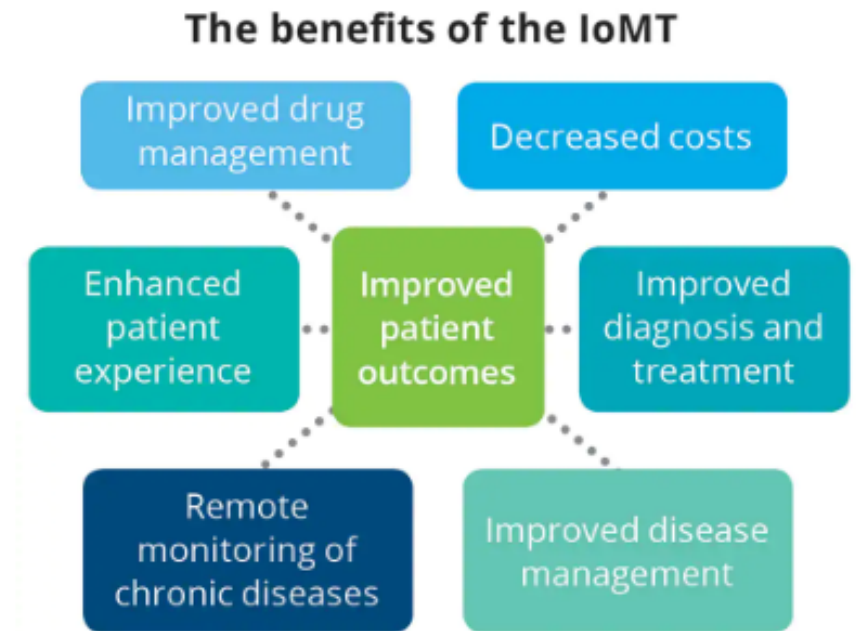
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**KD [2]1** Added "in a health care facility"  
Knapp, David, 8/29/2019



# Benefits of Smart Health Care Facilities

- Internet of Medical Things - \$158 billion
- Manage medical equipment virtually
- Remote monitoring of patient's health
- Remote equipment configuration
- Automated data flow for patient's health analytics
- Electronic medical records
- HIPPA compliance/data security



Source: Deloitte

# Leading Hospital Technology

## Dozens of Subsystems!

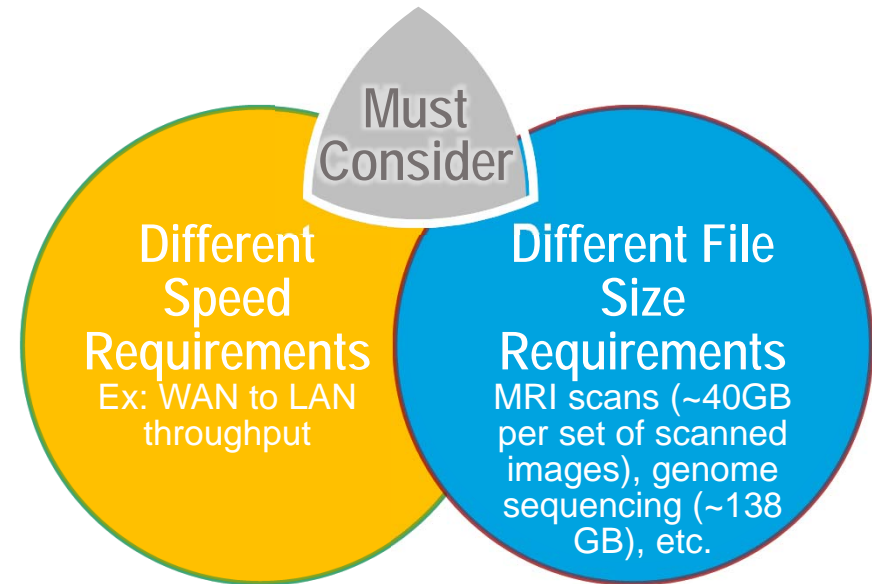


- Audio Visual Presentation Systems
- Biomedical Telemetry
- CATV Distribution
- Distributed Antenna Systems
- Dictation and Transcription
- Fire Stop
- Integrated Operating Room Systems
- Intercom
- LED Lighting
- Nurse Call
- PACS (medical image viewing, storage and retrieval)
- Paging/ Public Address/
- Mass Notification
- Patient Monitoring
- PYXIS (medication station)
- Radio Systems
- Radio Systems
- RTLS
- Security
  - Access Control
  - Area of Refuge/ Area of Rescue
  - Duress
  - Emergency Call
  - Infant protection
  - Intrusion Detection
  - Video Surveillance
  - Wander Management
- Sound Masking
- Structured Cabling
- Surgical Suite Communications
- Synchronized Clock
- Time and Attendance Clock
- Wireless Networking

Source: AccuTech

# Smart Hospitals = Smart Infrastructure

- **Telco Room Sizing**
  - Best practices
- **Cable Management and Pathway**
  - Connectivity
- **Grounding and Bonding**
  - Safety
- **Monitoring and Security**
  - HIPPA-compliant data security
- **Resilience and Seismic Requirement**
  - Natural disaster and casualties





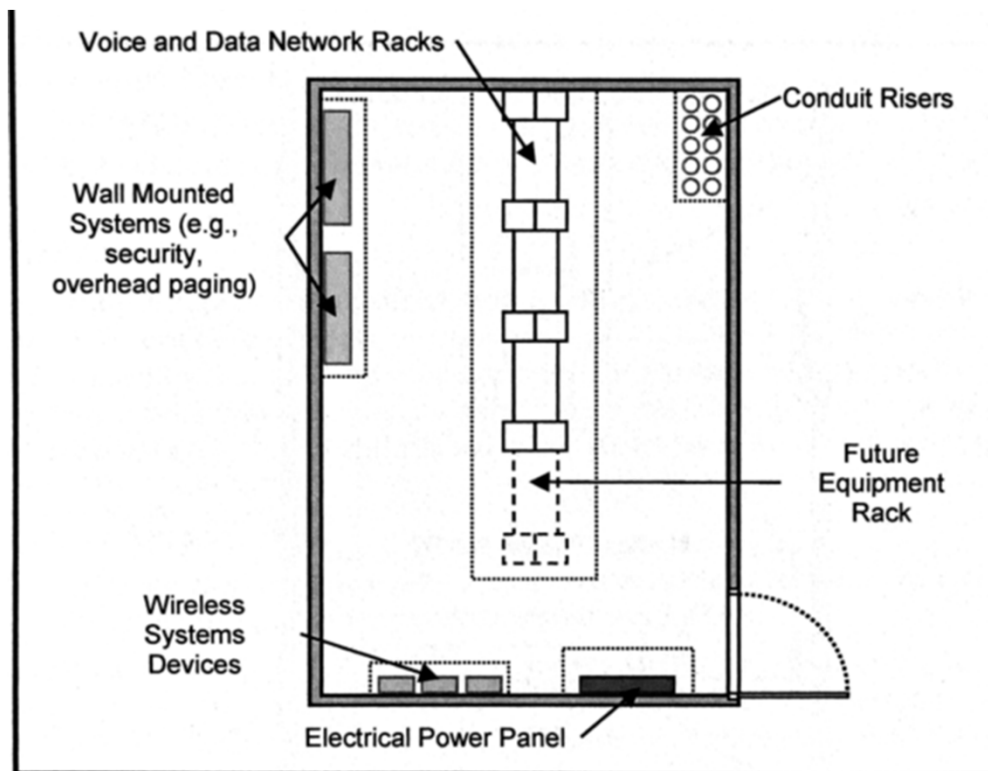
# Room Sizing

# Fitting It All Into 1 Room, Maybe 2

- ANSI/BICSI 004-2018 Room Sizing
- **ER** = Equipment Room
  - Above highest known flood level
  - MC/Main Cross-Connect located here
  - **10'x12'** minimum.
    - Don't ask for 120' sq. ft. You may get a 5' x 24' room.
  - 100% Growth Factor

# ANSI/BICSI 004-2018 Room Sizing: *Typical TR*

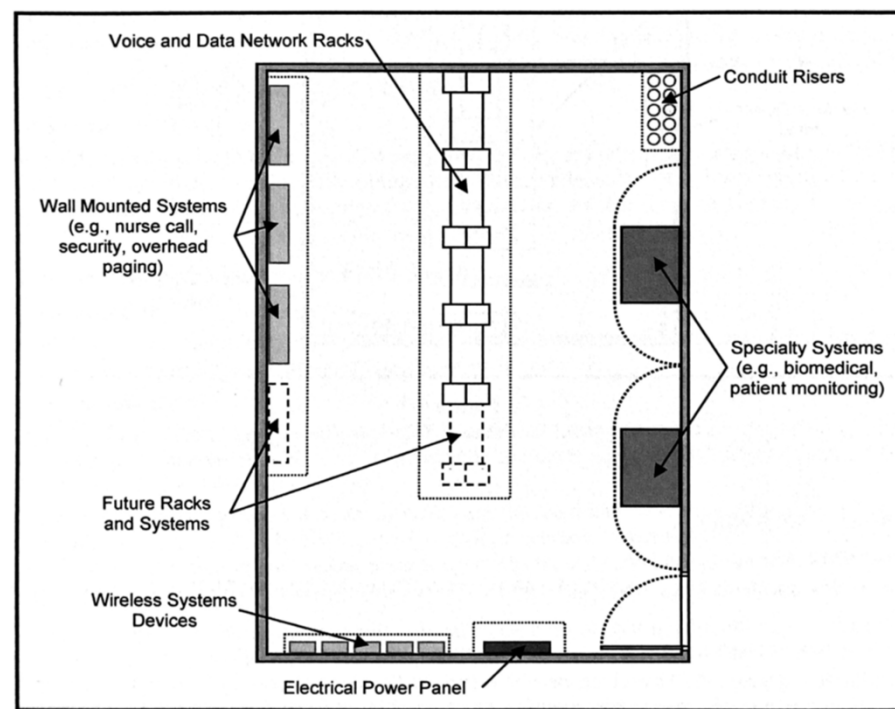
- **NFPA 99**: National Fire Protection Association, [Code](#)
- **ANSI/TIA-1179-A**, ISO/IEC 14763-2, [FGI Guidelines](#)
- 1 per floor min
- 20,000 sq. ft. max service area
- **12'x14'** min floor area where AHJ requirements not present
- 50% growth factor



# ANSI/BICSI 004-2018 Room Sizing: TR

(with undefined systems)

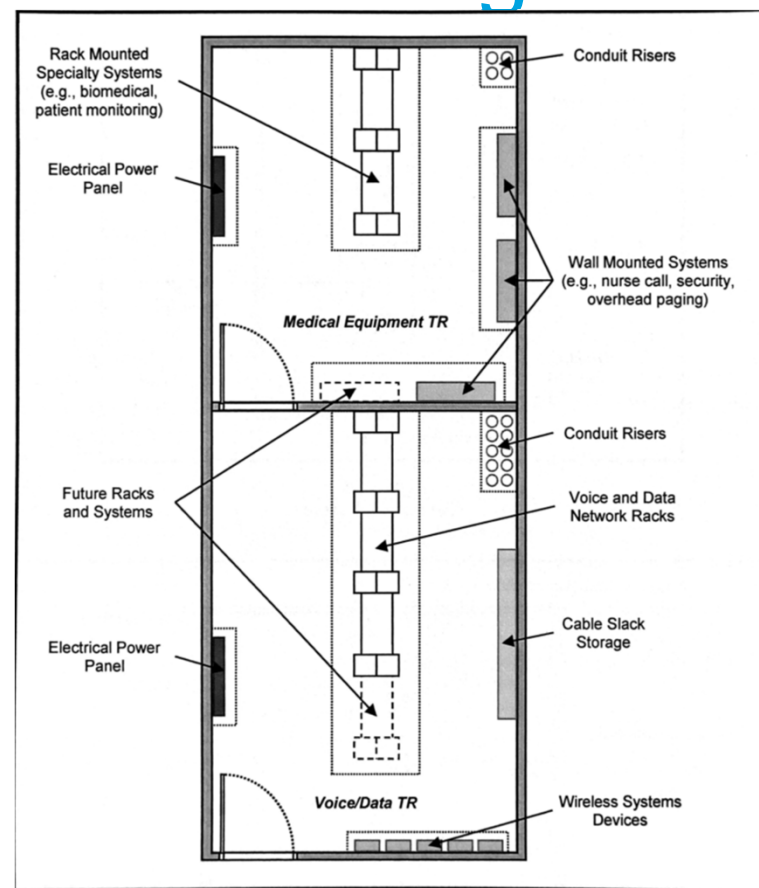
- NFPA 99,
- ANSI/TIA-1179-A, ISO/IEC 14763-2, FGI Guidelines
- 1 per floor min
- 20,000 sq. ft. max service area
- 12'x16' min floor area where AHJ requirements not present
- 50% growth factor



# ANSI/BICSI 004-2018 Room Sizing:

## TR (split rooms)

- For hospitals that don't allow voice/data spaces with medical or building spaces
- NFPA 99
- ANSI/TIA-1179-A, ISO/IEC 14763-2, FGI Guidelines
- 1 per floor min
- 20,000 sq. ft. max service area
- 12'x16' min floor area where AHJ requirements not present
- 50% growth factor

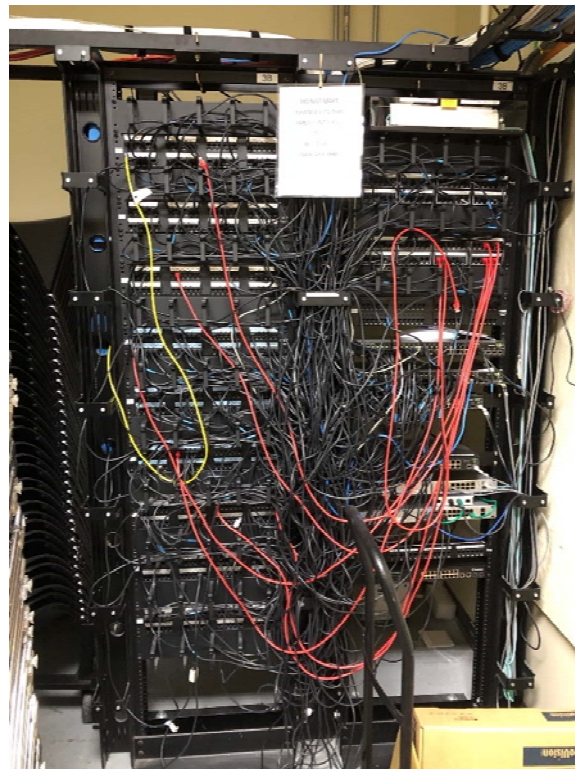
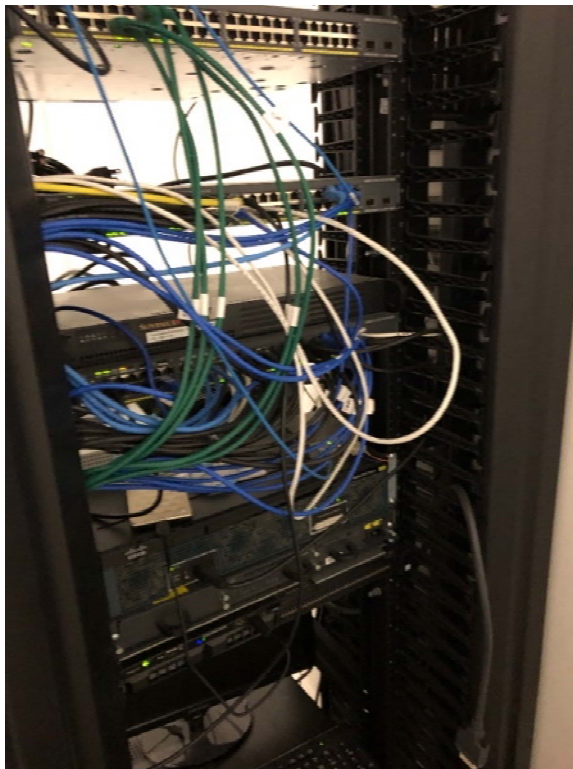






# Cable Management and Pathway

# Cable Management



# CPI Cable Fill Table

- No one should design to 100% cable fill
- Design half-full to allow for growth and changes
- Use the Cable Fill Table

Change the values in the cells that are highlighted in yellow to estimate cable fill values for different diameter cables or fill ratios.												
<b>Estimated Cable Fill Capacities for CPI Cable Management and Pathway Products</b>												
Part Number	Description	Cable Manager Specs.			Recommended Fill			Maximum Cable Fill				
		Interior Width (in.)	Interior Depth (in.)	Usable Area (sq. in.)	Cable	Cat 5e	Cat 6	Cat 6a	Cat 5e	Cat 6	Cat 6a	
					OD (in.)	0.200	0.250	0.300	0.200	0.250	0.300	
Fill (%)	50%	50%	50%	100%	100%	100%						
32610-XXX	Motive Single-Sided Vertical Vertical Cable Manager, 6"W x 15.5"D	Varies	11.5	43.7		348	223	155	696	445	309	
32611-XXX	Motive Single-Sided Vertical Vertical Cable Manager, 8"W x 15.5"D	Varies	11.5	66.7		531	340	236	1062	679	472	
32612-XXX	Motive Single-Sided Vertical Vertical Cable Manager, 10"W x 15.5"D	Varies	11.5	89.7		714	457	317	1428	914	634	
32613-XXX	Motive Single-Sided Vertical Vertical Cable Manager, 12"W x 15.5"D	Varies	11.5	112.7		897	574	399	1794	1148	797	
32614-XXX	Motive Single-Sided Vertical Vertical Cable Manager, 15"W x 15.5"D	Varies	11.5	147.2		1171	750	521	2343	1499	1041	
32620-XXX	Motive Double-Sided Vertical Vertical Cable Manager, 6"W x 23.6"D (Front/Rear)	Varies	8.7	33.0	Front	263	168	117	525	336	233	
		Varies	8.7	33.0	Rear	263	168	117	525	336	233	
32621-XXX	Motive Double-Sided Vertical Vertical Cable Manager, 8"W x 23.6"D (Front/Rear)	Varies	8.7	50.4	Front	401	257	178	802	513	357	
		Varies	8.7	50.4	Rear	401	257	178	802	513	357	
32622-XXX	Motive Double-Sided Vertical Vertical Cable Manager, 10"W x 23.6"D (Front/Rear)	Varies	8.7	67.8	Front	540	345	240	1079	691	480	
		Varies	8.7	67.8	Rear	540	345	240	1079	691	480	
32623-XXX	Motive Double-Sided Vertical Vertical Cable Manager, 12"W x 23.6"D (Front/Rear)	Varies	8.7	85.2	Front	678	434	301	1356	868	603	
		Varies	8.7	85.2	Rear	678	434	301	1356	868	603	
32624-XXX	Motive Double-Sided Vertical Vertical Cable Manager, 15"W x 23.6"D (Front/Rear)	Varies	8.7	111.3	Front	886	567	394	1771	1134	787	
		Varies	8.7	111.3	Rear	886	567	394	1771	1134	787	

# Cable Fill Ratio Critical in Vertical Cable Management

- 6x 48 port patch panels = 288 cables, 144 each side
- Already approaching 50% fill on 8" Wide VCM (144 vs. 178)
- Additional cabling: Day 1 & 2
- 50% filled rack? Not likely
- Precious real estate. Racks not going to move...EVER



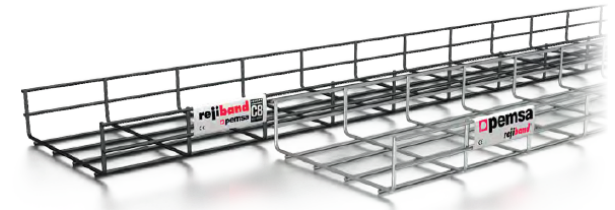
# Cable Support Beyond the Rack or Cabinet

- **Applications:**

- Data Centers, Buildings, Photovoltaic/Energy, Tunnels, Food Industry, Pharmaceutical

- **Considerations:**

- Route, corrosion resistance, support, weight, bonding, heat, safety, accessibility, accessories



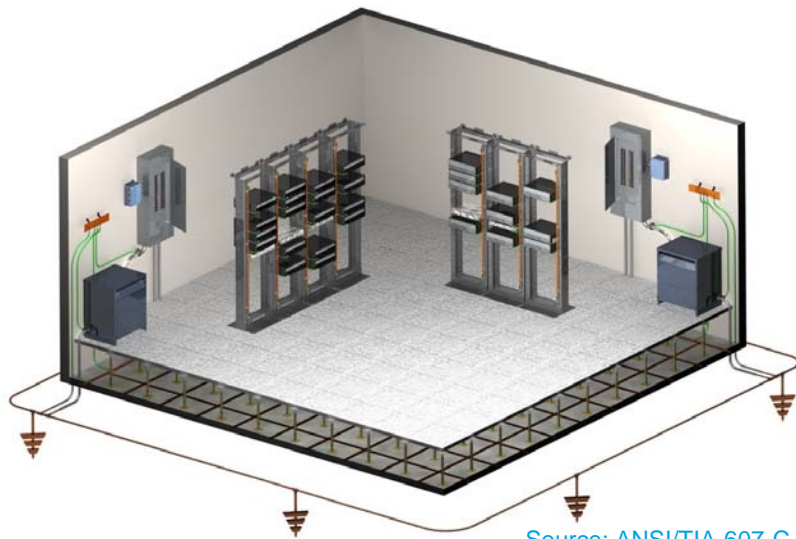


## Bonding & Grounding

# ANSI/TIA-607-C

Defines a simple method for providing access (a pathway) to earth ground for communications equipment and network cabling.

## Bonding separately derived systems

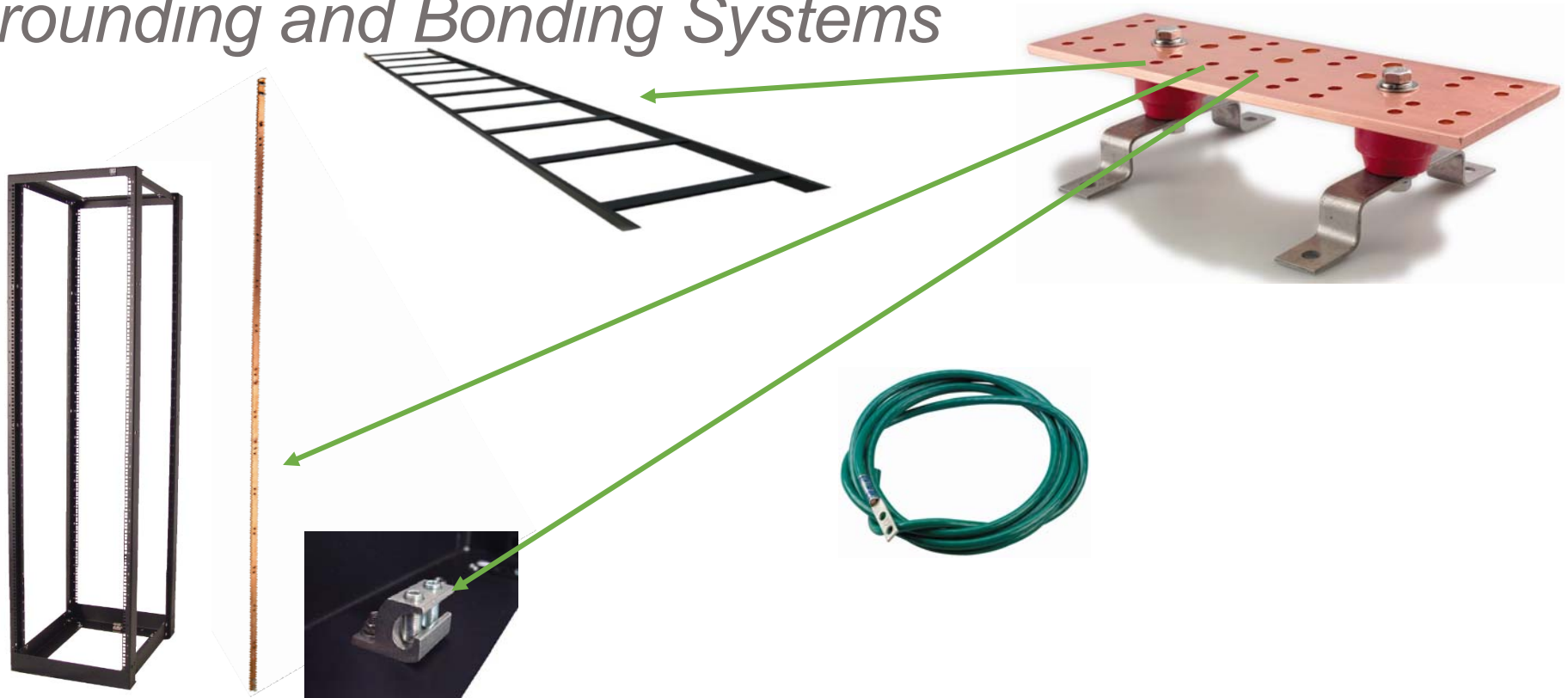


Source: ANSI/TIA-607-C

Bonding backbones to improve high-frequency performance



# Overview of Telecommunications *Grounding and Bonding Systems*







# Integrated Power Management

# Intelligent Power Distribution

Invest in remotely manageable intelligent hardware—Rack Power Distribution Units (PDUs)

- More granular, complete visibility = concrete steps to reduce power consumption
- Remotely reboot hung equipment and monitor at the device level
- Locking outlets to prevent accidental equipment disconnections
- Secure Array IP consolidation technology – save \$ on networking costs



# Environmental Monitoring

- Remote monitoring of sensors and devices in equipment rooms
- Monitor for water, smoke, gases, access, temperature, humidity, pressure, etc.
- Minimize hardware failures
- Reduce cooling and hence operational costs
- Single web-based interface for accessing and reviewing all data



# Access Control

- Meet regulatory compliance of data security per HIPAA, HITECH, FEMA
- Integrated sensors for lock and latch status, monitoring and alarm functions
- Remote unlock capability; user-configurable unlock time delay
- High-security lock with mechanical key override
- Reader recognizes most existing employee access cards



# Resiliency and Seismic Requirements



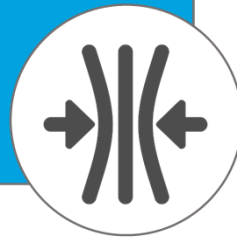
# Don't Let Your Data Center Look Like This



# Resiliency

“89% hospital facility professionals consider resiliency, ability to withstand natural disasters and power outages, some of the most critical components in the design of new health care facilities.”

- American Society for  
Healthcare Engineering  
Survey



“Construction related to health care facilities will require many changes.”

- SPI Insights



- Duluth, MN: \$1.8B
- Massachusetts General Hospital : \$1B expansion

# Regional Priorities/Top Concerns

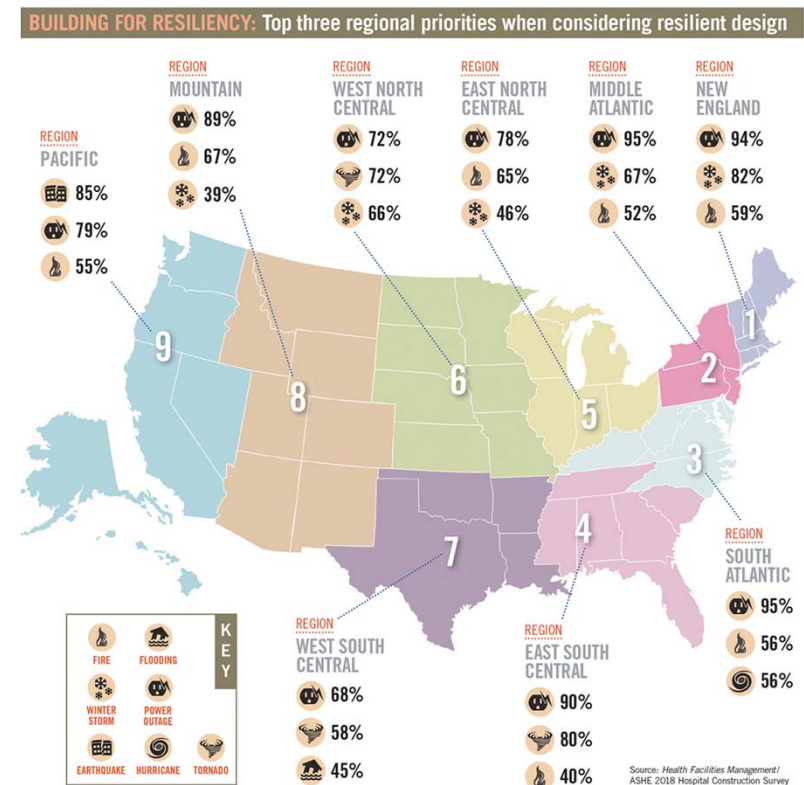
Pacific:

- Earthquake, power outage (2nd)

All other regions:

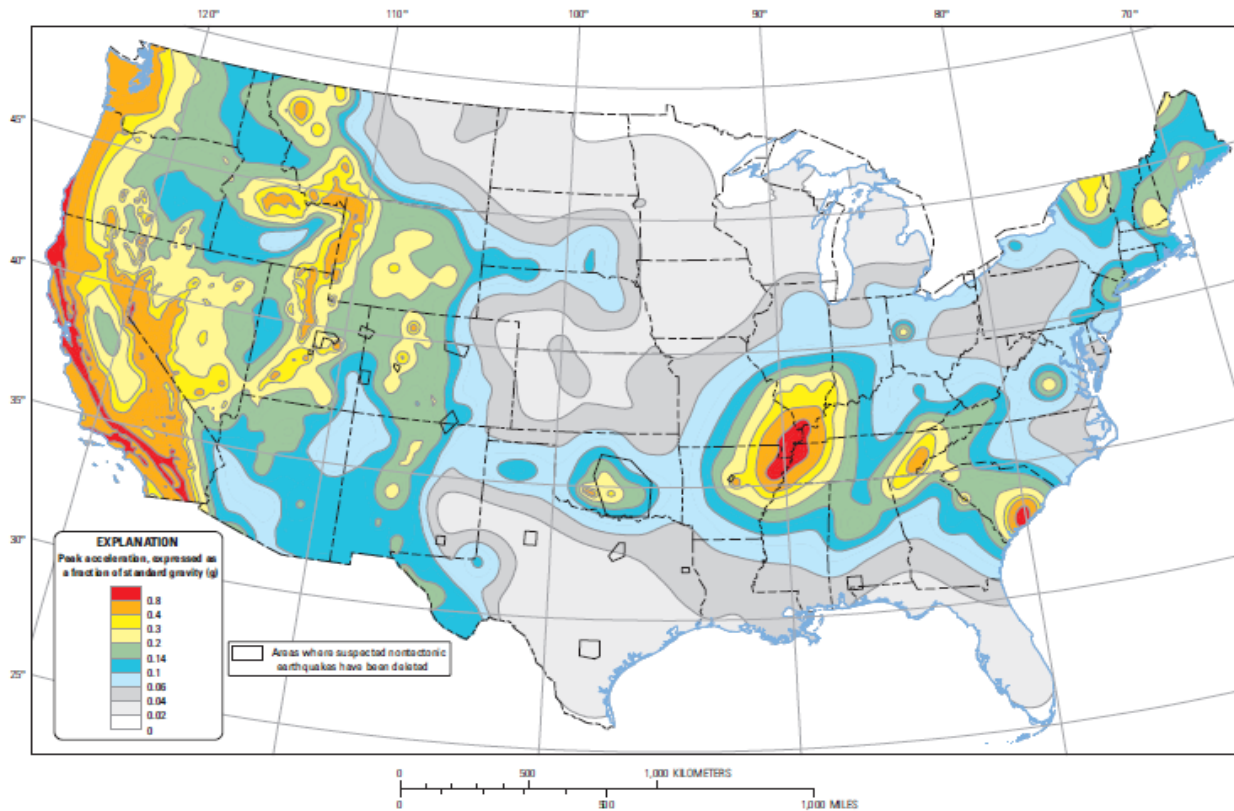
- Power outage

- IBC (International Building Code)
- ASCE 7: American Society of Civil Engineering
- NFPA 13 (National Fire Protection Association)





# Why Are Earthquakes a Concern?



Two-percent probability of exceedance in 50 years map of peak ground acceleration

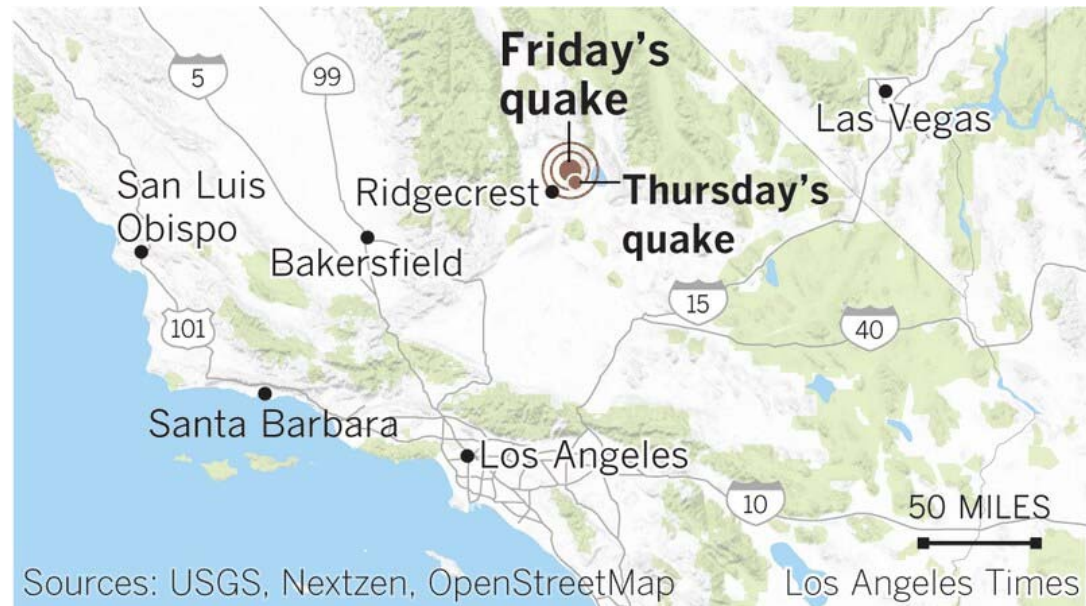
Source: U.S. Geological Survey (USGS)

## 7.1 earthquake shakes the Southland

The shaking felt from Friday's magnitude 7.1 earthquake near Ridgecrest reached a "violent" level, or level 9 on the Modified Mercalli Intensity Scale, closest to the epicenter. Los Angeles, about 125 miles away from the epicenter, felt "light" or "weak" shaking, at intensity level 4 or less.



Thursday, July 4<sup>th</sup>, 10:33am: 6.4 quake  
Friday, July 5<sup>th</sup>, 8:20pm: 7.1 quake





US » Patients wheeled out of a hospital, some still hooked to IVs, after earthquake hits

Live TV

# Patients wheeled out of a hospital some still hooked to IVs, after earthquake hits

By Paul Vercammen, CNN

Updated 1:38 AM ET, Sat July 6, 2019



More from CN




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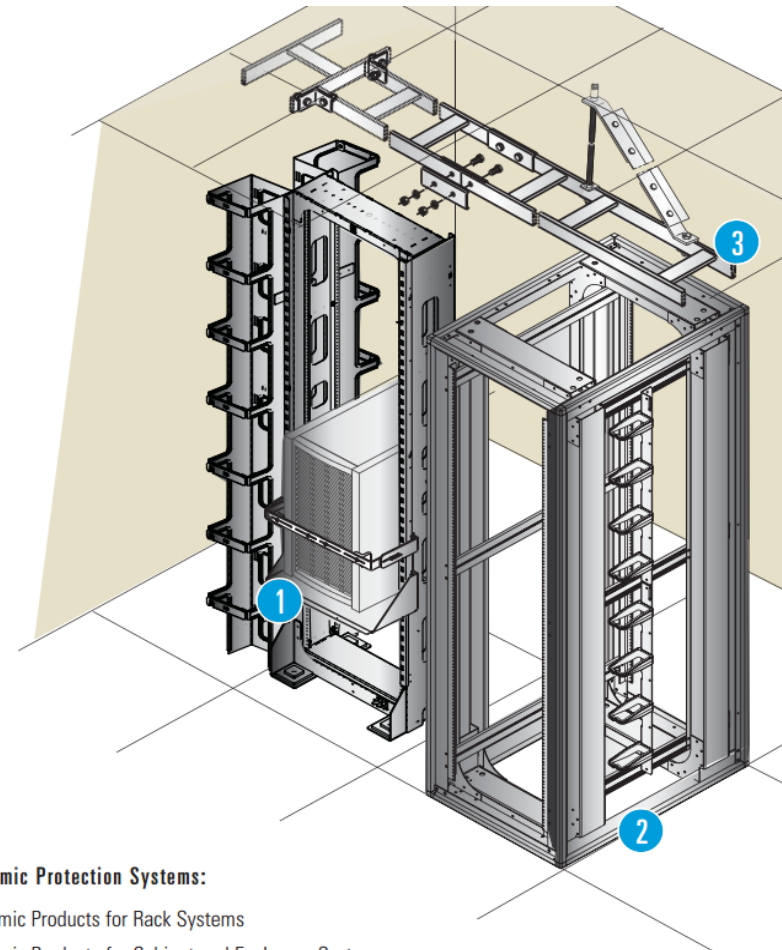
Skip the trip to the store  
\$15 off your first order of \$35+  
with code FRESH15  
Restrictions apply



**Ridgecrest Regional Hospital evacuated after 6.4 earthquake rattles California**

# Seismic Bracing

- Authority Having Jurisdiction (AHJ)
- Seismically tested vs. rated
- Racks
- Cabinets & Enclosures
- Runway



**CPI Seismic Protection Systems:**

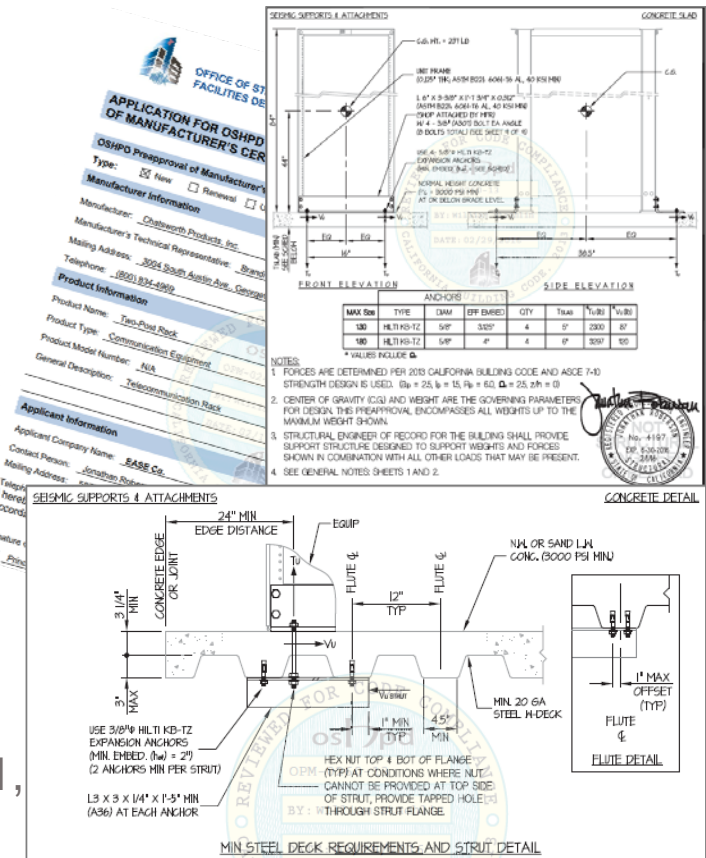
- 1 Seismic Products for Rack Systems
- 2 Seismic Products for Cabinet and Enclosure Systems
- 3 Seismic Products for Cable Runway

# Confusion

- Which “Zone 4”? UBC, IBC, or NEBS?
  - Ask the AHJ
  - UBC Zone 4 seismic map replaced by IBC High Seismic Area map
- Telcordia Technologies , Inc. GR-63-CORE, NEBS Zone 4: Network Equipment Building Systems
  - 1,000lbs, 8.3 earthquake magnitude

# OSHPD and OPM

- OPM is a voluntary program for review and approval of seismic design of supports and attachments for nonstructural components to be used in health facilities construction in California
- An issued OPM means the combination of components, supports and attachments described by the OPM has been pre-approved for use in those specific conditions described in the OPM
- OPM are required for California Building Code (CBC) 2013-based projects and can also be used for CBC 2001, CBC 2007 or CBC 2010 based projects



# Seismic test of Rack Video



# Seismic Test of Cabinet Video





# The Prescription:

- ✓ Equipment and telecom room sizes need to be larger to accommodate additional systems (ref. NFPA99, TIA-1179, BICSI-004)
- ✓ Plan cable management and pathway spaces with at least 50% open space for growth and changes
- ✓ Monitor power, environmental conditions and security in equipment and telecom rooms to help prevent power outages and protect data
- ✓ In seismic zones, California OSHPD OPM provide excellent planning and installation guidance
- ✓ In seismic zones, consider seismic-rated (shaker tested) racks to maximize load per footprint

Questions?

# Thank You!

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