

The background features a dark blue gradient with a glowing, tunnel-like effect on the right side. The tunnel is formed by numerous thin, curved lines that create a sense of depth and movement, leading the eye towards the right. The overall aesthetic is modern and technological.

Data Center Impact on the Fire Department

Assistant Chief Kraig Knapp

- My focus is public safety and fire prevention.
- My data center knowledge is based largely on research done for the proposed QTS project in Vienna / Deforest.
 - Meetings with QTS representatives
 - Presentation by an engineering firm experienced in data center design
 - Tour of a QTS site. Partially operational, partially under construction
 - Met with representatives of the fire department providing service to the QTS site
- I have no conflicts of interest

Do batteries in large data center facilities create unique challenges?

YES!

- Data centers commonly use Lithium-ion battery technology to provide uninterrupted power for the computers. The batteries cover the time from when line power goes out until the generators provide back-up power.
- **electrical faults and battery thermal runaway** are among the most common causes of data center fires.
- Lithium-ion battery fires are extremely difficult to extinguish because of the high heat and gasses released.

Table 1

Summary of information on selected data center fires (Judge, 2021, 2022; Miller, 2022; Johnson, 2025; Zhang, 2023; Yoon and Ahn, 2025).

| Company | Location | Date | Cause | Damage | Key Lesson |
|---|----------------------------|------------|------------------------------|---|---|
| National Information Resources Service (NIRS) | Daejeon, South Korea | 9/26/2025 | Lithium-ion battery failure | Extensive data loss, extensive government service disruptions | Battery mishandling can induce severe thermal runaway |
| Digital Realty | Hillsboro, Oregon, U.S. | 5/22/2025 | Power cabinet failure | \$250,000 equipment damage, possible outage | Electrical and mechanical failure can ignite non-Li batteries |
| Windstream | Lincoln, Nebraska, U.S. | 9/2/2023 | Water damage from leak | Equipment damage, 911 service disruption | Small leaks can cause highly impactful outages |
| Maxnod | Ain, France | 3/28/2023 | Lithium-ion battery failure | Extensive building, equipment, and cable damage | Li-ion batteries can ignite without direct mishandling |
| SK Group | Seoul, South Korea | 10/15/2022 | Lithium-ion battery failure | Server damage, internet outages and disruptions | System resilience becomes more crucial as online services expand |
| Google | Council Bluffs, Iowa, U.S. | 8/8/2022 | Electrical cabinet arc flash | Equipment damage, possible outages | Most large electrical equipment can be susceptible to severe failure |
| WebNX | Ogden City, Utah, U.S. | 4/4/2021 | Generator failure | Server damage | Proper fire suppression can limit damage severity |
| OVHcloud | Strasbourg, France | 3/10/2021 | Water damage | Extensive building, equipment, and cable damage | Excessive moisture can cause electrical fires that airflow can exacerbate |

NorthC data center fire

- Almere Netherlands
- May 7, 2026
- 11 MW facility
- ~280K Square Feet
- Took over 12 Hours to suppress
- Cause is under investigation, but the fire reportedly originated in the power distribution / battery systems area



Lithium-ion is not unique to data centers



- Found in a variety of electronics, consumer products, and vehicles.
- Battery fires are usually the result of physical damage, overcharging, and exposure to extreme temperatures.
- All of these leading causes are less likely to occur in a data center
- Battery storage in a data center may be in a separate compartment from the main building

Do numerous amount of backup diesel generators create unique challenges?

Potentially

- Spills are possible but unlikely
- Challenge is understanding the power system and how to completely de-energize an area or an entire building.
- Contribute to the difficulties in accessing the building

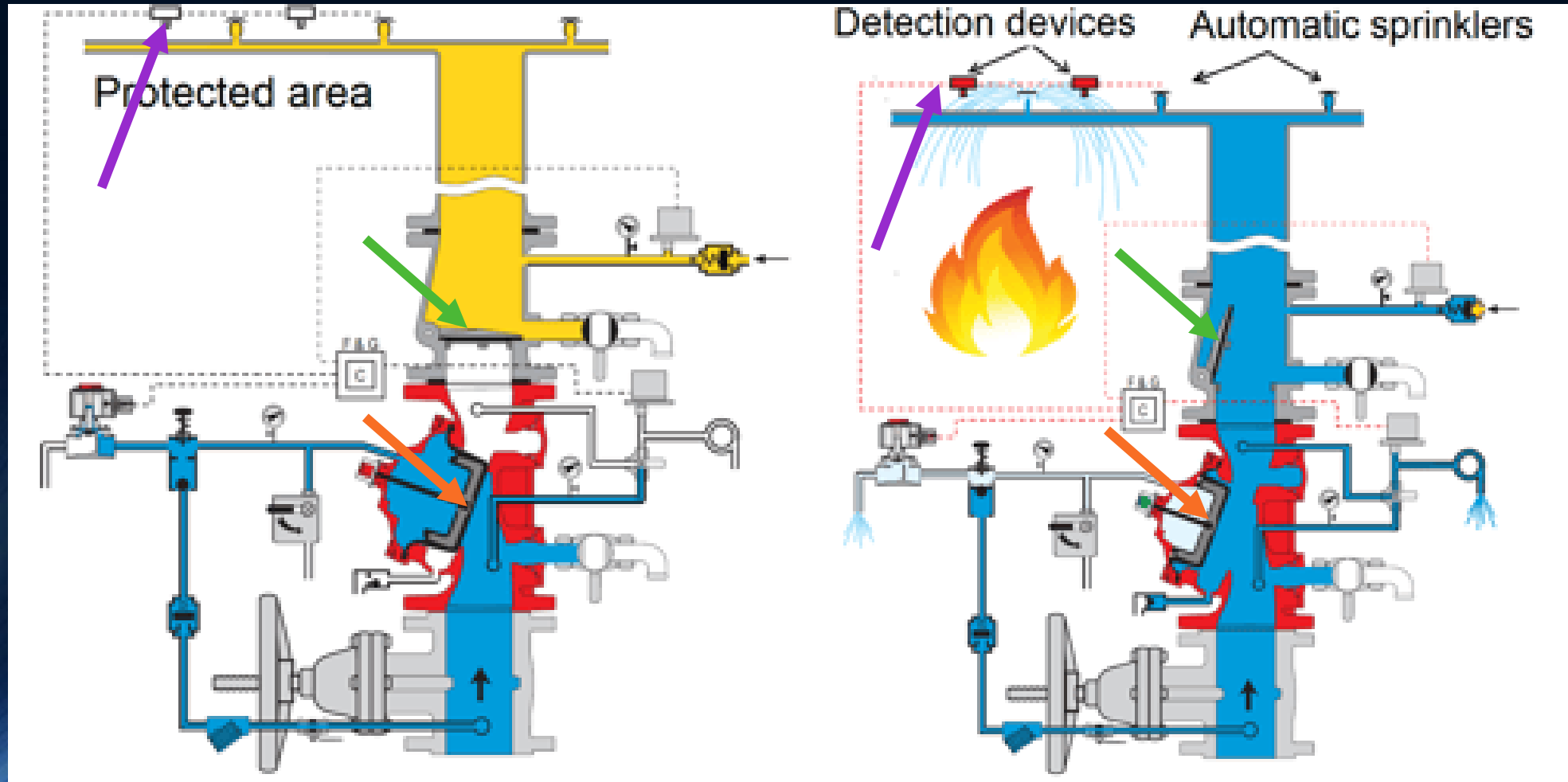


What kind of fire suppression do these facilities typically utilize?

Water based pre-action sprinklers

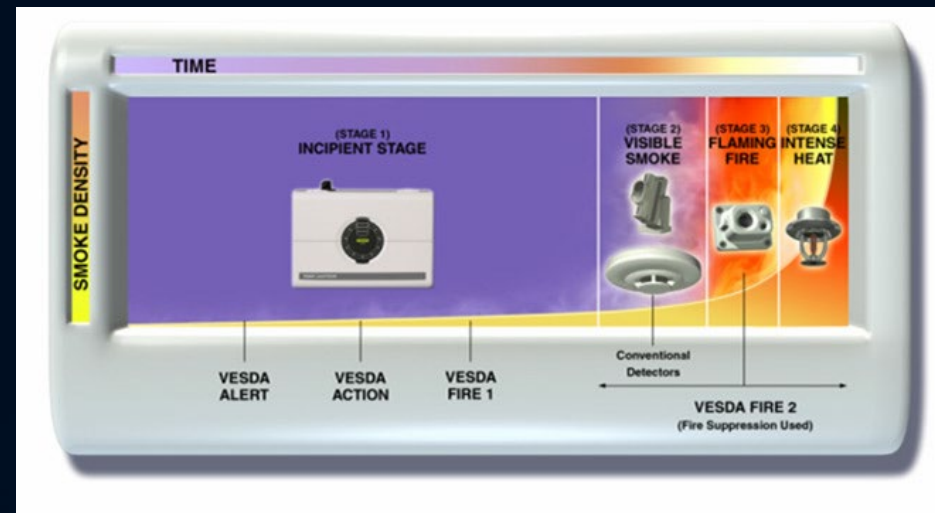
- “Older” or “Smaller” facilities may use some sort of clean agent system
- System of choice for modern large scale data centers
 - Effective
 - Reliable
 - Relatively easy to maintain
 - Lowered risk of water damage from accidental activation or leaks
- Increased risk of electrical hazards

Pre-Action Suppression



VESDA (Very Early Smoke Detection Apparatus)

- Advanced aspirating smoke detection system. It actively draws air through a network of piping to continuously sample the environment. Using highly sensitive laser technology, it identifies microscopic smoke particles, detecting fires at their smoldering, incipient stages long before flames are visible



How much of a challenge does the sheer scale of these facilities present for a typically sized fire/EMS operation?

NEGATIVES

- These campuses are massive. A significant fire event at one building would easily overwhelm the resources of a typical fire/EMS department.
 - Apparatus
 - Personnel
 - Water
 - Time
- Security fencing and other barriers

POSITIVES

- Occurrences are rare
- Resources are dedicated to response planning
- Commitment to safety is unmatched
- Onsite emergency responders

What sort of resources, trainings, and/or equipment are needed for communities to be able to handle these challenges?



- Electrical Hazards
 - Training – Many departments are not trained to safely operate around this kind of electrical equipment I.E. Arc Flash
 - Equipment – Voltage detection (hot sticks). Arc flash PPE. Nonconductive equipment
 - Capabilities of the utility providers?
- Radio Communications
 - Design of these buildings may limit effectiveness of responder's portable radios.

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- Fire Suppression
 - Apparatus capable of supplying the requirements of the sprinkler system
 - Water supply robust enough to handle large, long duration fires.
 - International Fire Code fire flow requirements are 8,000 gallons/minute for 4 hours. About 2 million gallons

Other thoughts

- Construction site access and traffic
 - 1000's of workers commute to the site on roads that may not be designed for the traffic. Potential increase in crashes
- Proximity to emergency services and alternate routes
- Balancing security requirements with incident pre-planning.
 - Feeling of being on a military base.
- Open communication and a relationship with the facility are keys to success.



Questions?

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