IAITAM ACE 2025

ITAM - Another Brick In The Wall

A.I.'s Impact on Data Center Infrastructure

Accelerating Decommissioning & Data Destruction

Destroy Drive – Dag Adamson

April 22-24, 2025

Agenda

A.I. - Infrastructure 101

Baseline: Data Center Cost Economics
A.I. Tools driving the changes
Top 5 GPU Vendors
Comparing Traditional Server vs AI Servers

Top Issues A.I. driving the data center OPEX

Power Consumption & Heat

Heat Dissipation and Solutions

Take Aways – Bottom Line

Case Study:
Data Center and Facility Closure
-600 cabinet DC
-110K Sq Ft
-Return to Commercial White Space

Preliminary budget lesson: How to get it wrong

Actual Environment

Back to Basics – Scoping out:
- Data Destruction
- Onsite Decommission

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Operational Baseline Data Center Cost Economics

Cost Category	% of Total OPEX	Description
Power & Cooling	30–50%	Electricity for servers, cooling systems (CRACs, chillers, fans, etc.). GPU-heavy racks push this even higher.
Personnel / Staffing	10–20%	Engineers, security, operations, network admins, facilities staff — both on-site and remote.
Facility Maintenance	10–15%	Physical plant upkeep: HVAC systems, backup generators, UPS, fire suppression, physical security, etc.
Hardware Maintenance & Upgrades	10–15%	Ongoing replacement and support contracts for servers, networking gear, storage systems, etc.
Network & Connectivity	5–10%	Internet transit, dark fiber, interconnects (especially high for colocation and hyperscale providers).

A.I. Tools driving the changes (sample)

Text Generation

ChatGPT (OpenAI) – Conversational AI, writing, coding, and more.
Claude (Anthropic) – Helpful for summarization and reasoning-heavy tasks.
Perplexity AI – AI search engine with citations.
Jasper – Marketing copy, emails, blog content.

Image Generation

Midjourney – High-quality artistic image generation.
DALL·E (OpenAI) – Text-to-image and inpainting (editing images).
Adobe Firefly – Integrated into Photoshop, AI-powered creative tools.
Leonardo AI – Great for game assets and concept art.

Code Generation

GitHub Copilot (OpenAI + GitHub) – Code completion and suggestions in IDEs.
Replit Ghostwriter – AI assistant for coding in Replit.
CodeWhisperer (Amazon) – AI coding companion optimized for AWS.

Video & Audio

Runway ML – Text-to-video, video editing, green screen effects.
Pika Labs – AI video generation from prompts.
ElevenLabs – Hyper-realistic voice generation.
Descript – AI video/audio editor with overdub and transcription.

Productivity & Automation

Notion AI – Summarizing, writing, and organizing notes.
Microsoft Copilot – Integrated into Office tools like Word, Excel, and Outlook.
GrammarlyGO – AI-powered writing assistant.
Zapier + AI – Automation with AI-enhanced workflows.

Data Analysis & Visualization

Tableau GPT – AI-powered data insights and visualizations.
Power BI Copilot – Natural language queries for dashboards.
MonkeyLearn – Text analysis and data categorization.
Wolfram Alpha – Math, science, and data computation using AI.

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Top 5 GPU Vendors

NVIDIA
Dominates AI, data center, and gaming markets
Industry leader with GPU architectures like Ampere, Hopper, and Blackwell
Key player in deep learning, CUDA ecosystem, and GPU-accelerated computing

AMD (Advanced Micro Devices)
Strong in gaming (Radeon) and growing in AI/data center (Instinct MI series)
Competitive alternative to NVIDIA, especially with RDNA and CDNA architectures

Intel
Newer entrant in the discrete GPU space with Intel Arc (consumer) and Ponte Vecchio / Gaudi (data center/AI)
Strong CPU/GPU integration roadmap

Apple
Builds custom GPUs for Macs and iPhones using its Apple Silicon (M-series)
Focused on efficiency and machine learning (Neural Engine), not general-purpose discrete GPUs

Imagination Technologies
Supplies GPU IP (PowerVR) for mobile and embedded devices

Traditional Server vs. AI Server: Relative Computing Power

Metric	Traditional Server (CPU)	AI Server (GPU/Accelerator)	Relative Power
Typical Use Case	Web, databases, VMs, light analytics	AI/ML training, inference, HPC	—
Main Processor	1–2 CPUs (e.g., Intel Xeon, AMD EPYC)	4–8 GPUs (e.g., NVIDIA A100/H100)	—
Performance (FLOPs)	~0.5–2 TFLOPs (double precision)	100–1000+ TFLOPs (mixed precision)	100x – 1000x
Inference Throughput	Low to medium	High (batch inferencing at scale)	10x – 100x
Training Speed	Very slow	Trains massive models in hours/days	1000x+
Memory Bandwidth	~100–200 GB/s (CPU RAM)	1–3 TB/s (HBM2e/3 on GPUs)	10x – 30x
Networking	1–10 Gbps NIC	100–400 Gbps (NVLink, InfiniBand)	10x – 40x

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Traditional Server vs. AI Server: Relative Computing Power

Example:

- A **dual-socket Xeon server** might hit ~1.5 TFLOPs (FP64).
- An **NVIDIA A100 GPU** offers:
  - ~19.5 TFLOPs (FP32)
  - **312 TFLOPs** (Tensor Cores, FP16)
- A server with **8 A100s** = **>2,400 TFLOPs** in mixed-precision workloads — **over 1,000x** the raw AI compute of a CPU-based server.

Top Issues A.I. driving the data center OPEX

1. Massive Power & Cooling Demands
2. Energy Efficiency & Sustainability Concerns
3. Hardware Specialization & Acceleration
4. Scalability Pressure
5. Networking Bottlenecks
6. Infrastructure Complexity
7. Data Storage & Management
8. Security & Data Governance
9. Autonomous Operations (AIOps)
10. High CapEx & OpEx

Power Consumption: GPU Rack vs. Traditional Rack

Type of Rack	Typical Power Usage	Key Notes
Traditional CPU Rack	5–15 kW per rack	Standard servers with CPUs for general workloads, web apps, virtualization
GPU Rack (AI/HPC)	30–60 kW per rack (or more)	Packed with high-power GPUs like NVIDIA H100, A100, or AMD MI300 series; used for AI/ML, rendering, simulations

2x to 4x increase in Power!

Heat Dissipation: CPU Rack vs. GPU Rack

Rack Type	Typical Power Usage	Heat Dissipation	BTU/hr Estimate
🖥️ Traditional CPU Rack	5–15 kW	5–15 kW of heat	17,000–51,000 BTU/hr
🧠 AI GPU Rack (High-Density)	30–60 kW	30–60 kW of heat	102,000–204,000 BTU/hr

2x to 4x increase in Heat!

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Heat Dissipation Solutions

❄️ 1. Air Cooling (Traditional, Limited for AI)

- How it works: Fans and cold aisle/hot aisle airflow systems circulate air to remove heat
- Use case: Works for low to moderate density (~15–20 kW per rack)
-Limitations: Struggles with high GPU densities; inefficient beyond 20–25 kW

💧 2. Liquid Cooling

🟦 a. Direct-to-Chip (Cold Plate) Cooling

- How it works: Liquid coolant flows through cold plates mounted directly to CPU/GPU surfaces
- Pros: Efficient, compact, supports 30–80 kW+ racks
- Common in: NVIDIA DGX systems, supercomputing environments

🟩 b. Rear-Door Heat Exchangers (RDHx)

- How it works: A liquid-cooled radiator replaces the rear door of a rack to absorb hot air as it exits
- Pros: Retrofit-friendly; passive or active variants
- Limitations: Less effective for extremely dense AI loads, but still useful

Heat Dissipation Solutions

❓ 3. Immersion Cooling

🟦 a. Single-Phase Immersion

- How it works: Servers are submerged in non-conductive dielectric fluid; heat is transferred to fluid, which is circulated
-Pros: Very high efficiency, low noise, supports extreme densities
-Cons: Requires specialized enclosures; harder to retrofit

🟩 b. Two-Phase Immersion

- How it works: Liquid boils on hot components and condenses on a coil — very efficient heat removal
-Pros: Ultra high-density capable (100 kW+ per rack)
-Cons: Complex, costly, and usually used in cutting-edge or hyperscale deployments

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👍 4. Liquid-to-Air Hybrid Systems

-How it works: Uses both traditional air and targeted liquid systems, e.g., liquid for GPUs and air for rest
-Pros: Helps bridge legacy and modern infrastructure
-Good for: Gradual transitions to high-density AI workloads

Take Aways – Bottom Line

T**he Genie is out of the bottle** – voracious appetite for AI to address a broad set of business issues

Power is inadequate in existing infrastructure

Cooling is inadequate in existing infrastructure

Data Destruction for growing data sets will be required

Infrastructure – Retrofit or Move and Build

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Case Study: Client departure from Data Center and Entire Facility

Landlord requirements:
Return to White Space

Scope:
110K sq ft facility
600 Cabinets - legacy servers / storage
Computer Room Air Condition Units (CRAC)
Supplemental AC equipment on the roof
Cable removal – nonproduction / production areas
Fire Suppression
UPS
Backup generator and pad/parking lot
Fuel Supply

Review drivers for solution:
Data Disposition plan (wipe, destroy, hybrid)
Infrastructure information
Asset information
Environmental considerations
Permitting requirements

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Case Study: Data Center and Offices

-110K Sq Ft (multi-tenant)
-2 floor with basement DC
-Return to Commercial White Space

5,000 disks (small capacity)

600 Cabinets

UPS

CRAC Units

Additional Fire suppression system

Backup Generator with remote pad + fuel tank

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Hypothetical Solution (Client purchasing department solution/expectation)

Data Destruction - @5000 (=< 2tb) –remove from systems, transport, provide a certificate	No cost
Cabinets Qty: 600 – roll them out – 10 to 12 truckloads - 15% - 25% - 7-10 yr old plus servers - Remaining empty cabinets - “Disconnect cabling” fiber + copper	 Value/lb + Parts? $ Scrap $ Scrap
UPS	$$ Value
CRAC	$$ Value
Generator	$$$ Value
Multiple Floors of closets and storage	$ Value

Notes:

- No Inventory Information
- Procurement never visited
- Created budget based on virtually no information

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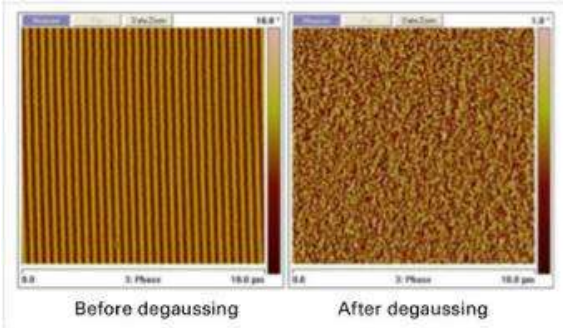
Data Destruction

Physical Destruction

- Born from the paper media destruction/shredding industry
- Mobile Shred Truck - Most common in N. America, EU, and Australia
- Crushing – NIST/DoD, GDPR and AAA NAID Compliant

Degaussing

Oceans 11- “a pinch”



Degaussing

- Eliminates/neutralize magnetic field
- Form of *physical* destruction
- Renders HDD unusable / destroyed
- Does not work for SSDs

Advantages:

- Very portable
- Small in footprint
- Different throughput (under a minute to seconds)
- Globally available in all markets

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Data Destruction

Wiping / Sanitization

- Good news: Ubiquitous
- Wiping isn't degaussing
- Software
- Fully embrace – cloud distribution or integrated with cloud
- Reporting: Higher accuracy
- Less operational impact – data destruction in the array or computer
- Low and High Volume
- Easy to mobilize
- A first step in physical data destruction process
- Best Option for recovery value

ziperase

EPS Extreme Protocol Solutions

blancco

BitRaser

Certus Software™
Certified Data Erasure Professionals

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Data Destruction

Why do we do it?

- It's the right thing to do – protect Personal Identifiable information (PII)
- Protect intellectual property
- It's the Law
- Avoid legal costs and government fines
- Bad for the brand

When things go wrong (no specific requirements, no due diligence, lowest cost option) :

Morgan Stanley:
- $60 Million Settlement (2022): In January 2022, Morgan Stanley agreed to pay $60 million to settle a class-action lawsuit.
- $35 Million SEC Fine (2022): In September 2022, the U.S. Securities and Exchange Commission (SEC) fined Morgan Stanley $35 million.
- +More $$

Customer Decision

Lowest cost - 3rd Provider collected and provided a certificate
Unknown/unverified process

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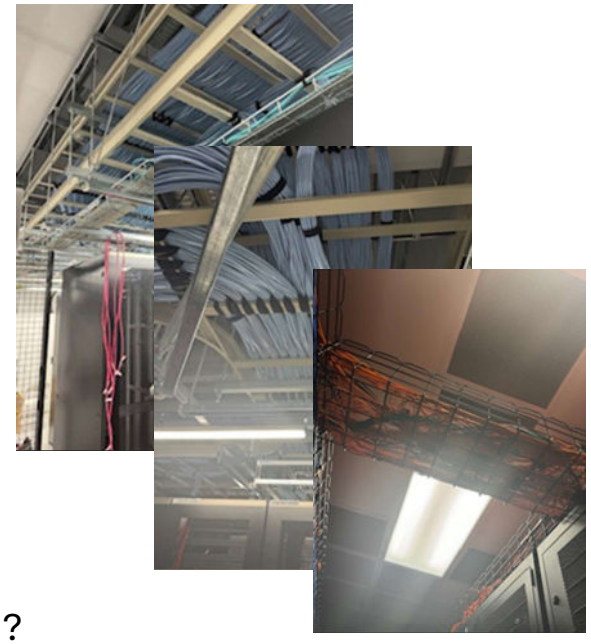
DC Decommissioning

Common questions/information gathering:

- Number of assets in cabinets
- Description of assets make / model
- Dimension Size (1U-8U+) // Weight
- Cabinet Size
  - 42U ~6 ft tall
  - 48U ~7 ft tall
  - 60U ~9 Ft tall

  Note: typical office door is 6’ 8”
- Cabinet on wheels / no wheels ?
- Bolted to the floor Y/N?
- Wire Ladders connected to cabinets Y/N?
- Comingling of production/other customer/decom wiring Y/N?

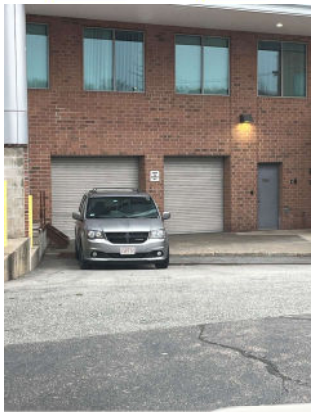


Customer Environment:
600 Cabinets - mixed
60U –wheels / no wheels
Wire Ladders
Comingled cables

-Facility built around DC
-All cabinets needed to be emptied
-Cabinets had to be removed on sides

DC Decommissioning

-Distance to the dock?
-Elevator to dock floor
-Loading Dock?
-Dock Leveler
-Rollup door



Customer Environment:
Rollup door

Implications:
Liftgate trucks
Limited availability of trailer with liftgate

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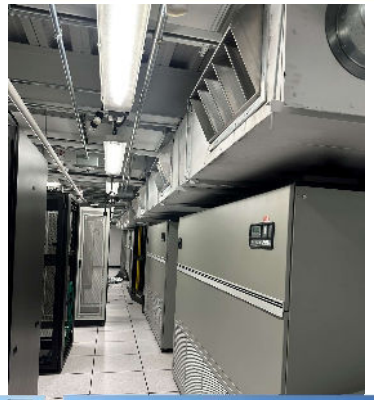
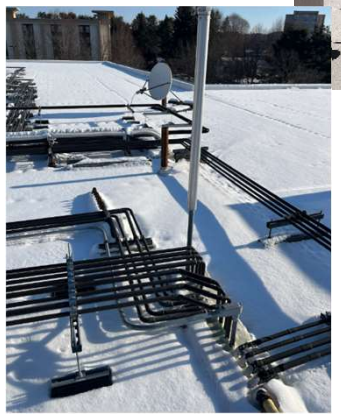
UPS

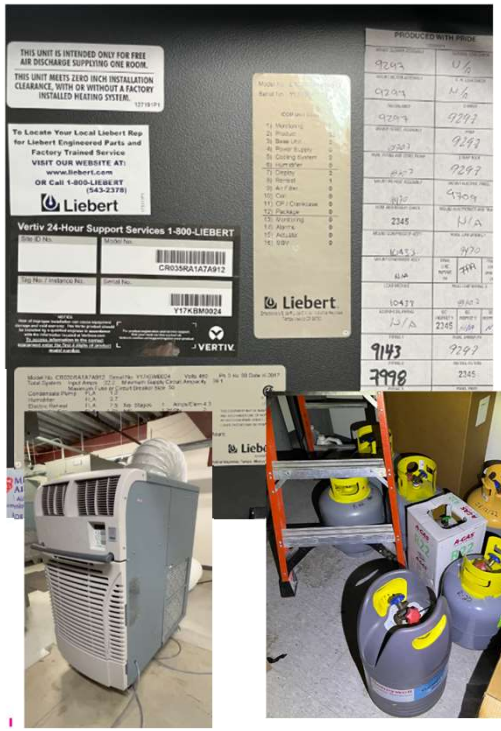
-Make
-Model
-Data Plate
-Battery Age
-Electrician assistance

Computer Room AC (CRAC)

-Data Plates
-BTU
-Age
-Rooftop removal considerations = Crane
-Plumping removal from roof to basement
-HVAC/Electrician required
-Type of refrigerant







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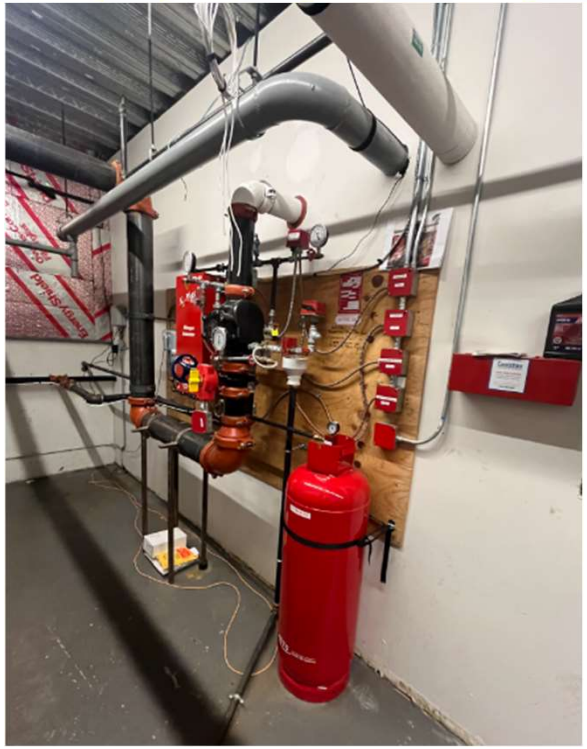
Fire Suppression System

-Data Plate
-Type of System
-Chemical - FM-200 or Halon
-Data Plate
-Licensed contractor
-Recovery/disposal



Generator

-Make
-Model
-Hours
-KVA
-Data Plate
-Fuel tank – Above /Below Ground

Client Implications:
-Concrete disposal (colored)
-Resurfacing parking lot
-Permitting to remove fuel tank

Initial Project Expectation		Project Reality
Data Destruction - @5000 (=< 2tb) –remove from systems, transport, provide a certificate	No cost	“Done at no cost” – High risk exposure Increased labor cost due to removing assets Having to move racks on their sides
Cabinets Qty: 600 – roll them out – 10 to 12 truckloads - 15% - 25% - 7-10 yr old plus servers - Remaining empty cabinets - “Disconnect cabling” fiber + copper	Value/lb + Parts? $ Scrap $ Scrap	Fiber is a universal waste – not income
UPS	$$ Value	OLD UPS / Mixed with New Positive contribution
CRAC	$$ Value	Crane required for roof removal / extra HVAC labor
Generator	$$$ Value	Permits still awaiting approval
Multiple Floors of closets and storage	$ Value	ITAD Vendor assessing value of scrap

2x – 3x higher than originally planned

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Key Tips for AI Migration – DC / Facility Decommission

- Visit site or have designated project manager visit site – prior to submitting project budget
- Negotiate to leave infrastructure that adds value in place
- Understand Liability Exposures – Data Privacy and Environment
- Develop high level operational plan for asset removal
- Message to Leadership: Involve an internal IT Asset Manager that has attended ACE or CITAM Certification

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Destroy Drive protects the world by protection its data.

Destroy Drive has systems engineers and equipment across the world to securely and quickly destroy data, meeting both legal and industry standards, while removing and protecting the value of the retired equipment.

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