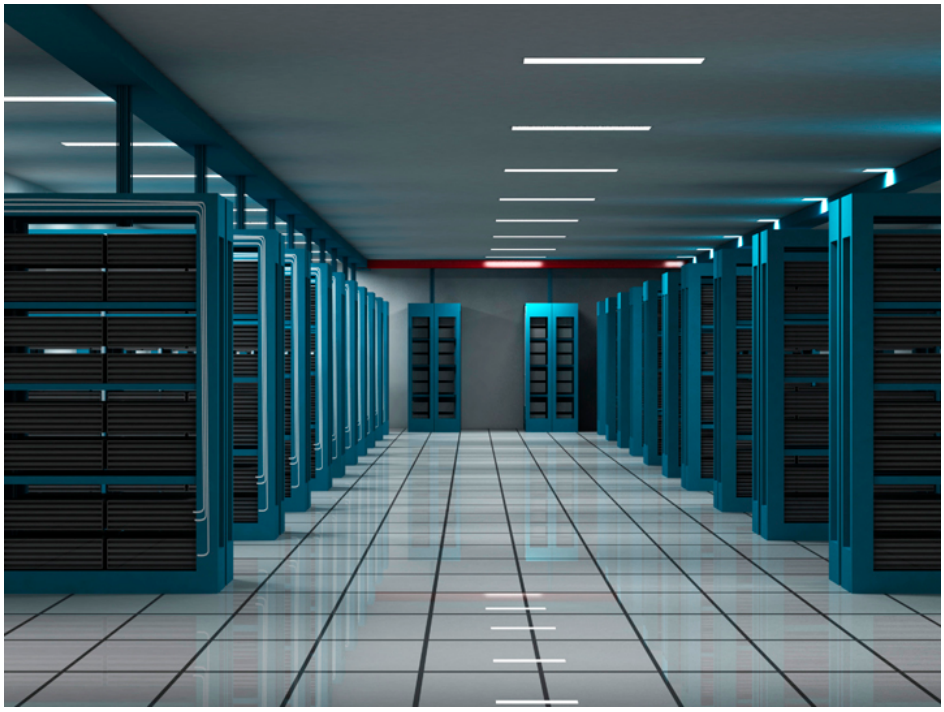
DATA CENTER MAINTENANCE

IT OPERATIONS

Why, What & When To Clean The Data Center



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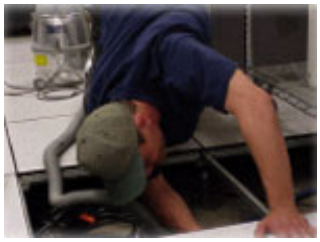
Introduction:

The service of data center cleaning has been a major focus of late for data centers, service companies and end users. This renewed focus on cleaning services is prompted by ASHRAE and manufacturers such as IBM, Dell and HP. None of these well-respected entities would recommend that the service be performed in-house.

Prior to starting Premier Solutions Co. in 1997, I spent 12 years in data centers selling disaster recovery, storage of data via media and data back-up solutions. I continually noticed loose dirt and dust (particulate) was evident in over 90% of my client base.

Thus, our service called, Data Center Maintenance **(DCM)** and Premier Solutions Co. was formed. To date, we have cleaned over ten million square feet of data center flooring, over one hundred thousand server cabinets and over one million servers and systems.

Our service began with little direction from the industry. Very few firms were specializing in offering data center maintenance. We used our knowledge from years of selling IT infrastructure solutions such as UPS, enclosures, KVM switching and power and cooling products to erect a service geared towards protection of the environment and the equipment housed within. We also consulted with tile manufactures on which solutions to use to clean raised flooring.



Many times, the frequency of service was based solely on the client's budget and/or lack of knowledge about the effect particulates can have on the data center, IDF, MDF and lab.

For most IT Budgets, 4% is set aside for maintenance within a predictable cost structure and OPEX. The cost of a preventative maintenance program is a fraction of your IT budget and the cost of physical equipment

As IT equipment shrinks in size, resulting in smaller components and less physical space between them, the risk of contamination grows. Increased heat loads per unit volume of air necessitates the need for more airflow, thus, increasing the exposure of electronics to detrimental effects of accumulated dust.

–ASHRAE 2009

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Inside An IBM Server

Frequency of Service Recommendations:

- HP recommends weekly dry mop and monthly damp mop
- SUN recommends quarterly floor surface and hardware decontamination

In today's high-density, virtualized centers, it is extremely important to keep the facility within "clean specifications" at all times. To achieve this, it may be required to have a top floor service done monthly, especially for sites located near freeways. High-traffic areas emit more carbon that will inevitably enter the data center.

Service	Minimum Recommended Frequency
Top floor cleaning	Once Quarterly
Sub-floor service	Once or Twice Annually
Hardware and servers	Twice Annually

Why Clean Servers?

Particulates move at high velocity into the intake of the servers. A low percentage of these particulates make it out of the server vent. Cleaning the faceplate and rear or side vent of the server should occur two to three times annually.

Contaminants And Particulates

It's important to identify the types of contaminates and particulates in the data center because "cause-effect" solutions are required to keep the OPS running 99.9999%. Many contaminates become corrosive due to the humidity in the room. We recommend that data center managers adhere at all times, not just after cleaning, to Ashrae TC9.9 recommendations of ISO14464-1 class 8 specifications. This can be accomplished via proper and frequent filtering of the room.

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A Particulate:

- Has the ability to damage equipment intermittently or permanently
- Has the ability to migrate to areas inside of equipment that can cause damage
- Accumulate in large abundance and work their way into the entire room due to the recycling of air
- Can be one of four types, metallic, carbon, construction or corrosive.

Metallic Particulates

Cause: Worn HVAC parts, electrical work, worn raised floor

Effect: The conductive properties are damaging to servers.

Carbon Particulates

Cause: Outside carbon from autos, printers or paper dust

Effect: Humidity in the data center transforms the carbon particulate into a conductive material which is damaging to servers. Carbon particulates can also be found in ceilings due to return airflow.

Construction Particulates

Cause: Sheet rock, unsealed sub floor, cement

Effect: Abrasive material that travels at high rates of speed via recycled airflow.

**** Progressive cleaning thru the stages of construction are recommended**

Corrosive Particulates

Cause: High humidity, water leakage, poor cleaning techniques

Effect: Corrosives that make their way into servers are metallic and abrasive.

Improper Sub-Floor Cleaning: Creating Bypass Air Flow

Improper Top-Floor Cleaning: Intro Of Water On Raised Floor

Common Fallacies:

- Use of "proprietary" cleaning solutions
- Use of "Specially formulated products"
- ISO compliant
- Using water to clean sub-floor (water and 480V don't mix)
- Keep water source off of the computer room floor
- Cable cutouts in server cabinets used to cool the cabinet
- Floor tiles stripped and waxed
- Improper sub-floor process

Caring For The Data Center

- Utilize clean step-mats at doorways
- Clean CRAC unit filters
- Use particle testing as a gauge of environment condition
- Close off server cabinet cut outs
- Have delaminated or trip tiles replaced
- Place perforated tiles in cold aisle/front of cabinet
- Inspect water cooling units regularly
- Disallow cardboard and pallets in center
- Removal and repair of sub floor corrosives
- Clean cabinets and hardware twice annually. Dust can create an "insulative layer" that will lead to heat related failures
- Clean sub floor twice annually

Why Clean Ceiling tiles?

For the data center using re-circulating air, the contaminates within the ceiling plenum make their way into the intake of the CRAC/HVAC in a short period of time and at a high velocity. Gauge the type of particulate captured in the HVAC filter and the duration of filter life to determine the needs for your ceiling.

Summary

We all know that data centers accumulate loose particulates. We know they travel through the center and make their way into the servers. Now more than ever, detailed due diligence is required. A regularly scheduled service with parameters in place and the identification of particulates will allow your data center to stay in optional health.

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