지속 가능한 데이터 센터를 위한 델 테크놀로지스의 비전 및 전략

양원석 전무
Director / Datacenter Sales

D∕ELL Technologies

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친환경 데이터센터로의 전환

현대적이고 지속 가능한 솔루션을 제공하면 환경에 미치는 영향을 줄이고 운영 비용을 낮출 수 있습니다

What is driving the shift to Green Data Centers?

- Environmental concerns
- Government regulations
- Corporate sustainability goals
- Customer demand
- Rising energy costs

Benefits of creating a Green Data Center

✔ Lower long-term operational costs

✔ Reduce electricity consumption

✔ Consolidate space requirements

✔ Lower carbon emissions

✔ Reduce waste output

Green data center market to hit $55 billion by 2027. Sustainable innovations the next big thing in data centers.

– Arizton Advisory and Intelligence

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현대적이고 효율적인 하드웨어 구성
Replace legacy hardware for greater energy efficiency, less rack space and higher performance per watt.

최적화된 열과 냉각
Optimize cooling capabilities from hardware to the data center.

효과적인 장치 전원 관리
Manage device settings to reduce energy waste.

관리형 워크로드 분산
Optimize workloads on premise and in the cloud.

영리한 데이터센터 전원 관리
Use data center telemetry to help lower your carbon footprint.

책임있는 자산 폐기
Retire equipment responsibly with recycling and take back programs.

녹색 에너지원
Migrate to renewable energy sources and consider colocations.

CREATING THE PATH TO A
Green Data Center

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효율적인 하드웨어 구성

Legacy hardware is a key contributor to high carbon footprints in the data center.
Investing in modern solutions that are engineered for the highest efficiency with power, thermals and performance will net immediate results in your energy bills while lowering your carbon footprint

에너지 효율

We are making our technology more efficient and less intensive to reduce energy waste.

열과 냉각

We are engineering new solutions for addressing the heat generated from these powerful machines. By reducing the heat, we can avoid energy wasted cooling the data center.

인프라 통합

We are making our products denser while simplifying storage data reduction to reduce our physical and carbon footprint in the data center.

Energy costs make up

40-60%

of data center's operating costs

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델 서버의 지속 가능성

에너지 효율

Engineering advancements have helped us reduce our energy intensity in HCI products by up to 83% since 2013 and we increased our energy efficiency by 29% from the previous generation*!

We also make it easier for you to manage your power budgets with data-driven insights with OME Power Manager.

열과 냉각

Reducing the energy and cooling needs of datacenters plays a huge role in facilitating a company's carbon footprint.

Our multi-vector cooling, liquid cooling, and thermal design capabilities are cutting-edge solutions to one of the biggest challenges in IT today.

인프라 통합

In 2013, it took six servers to do what is possible in just one server today. Reducing the amount of hardware required to meet business needs saves money and energy, while reducing e-waste.

PowerEdge has

43
EPEAT Bronze registered products

3.0
ENERGY STAR® throughout most of the portfolio

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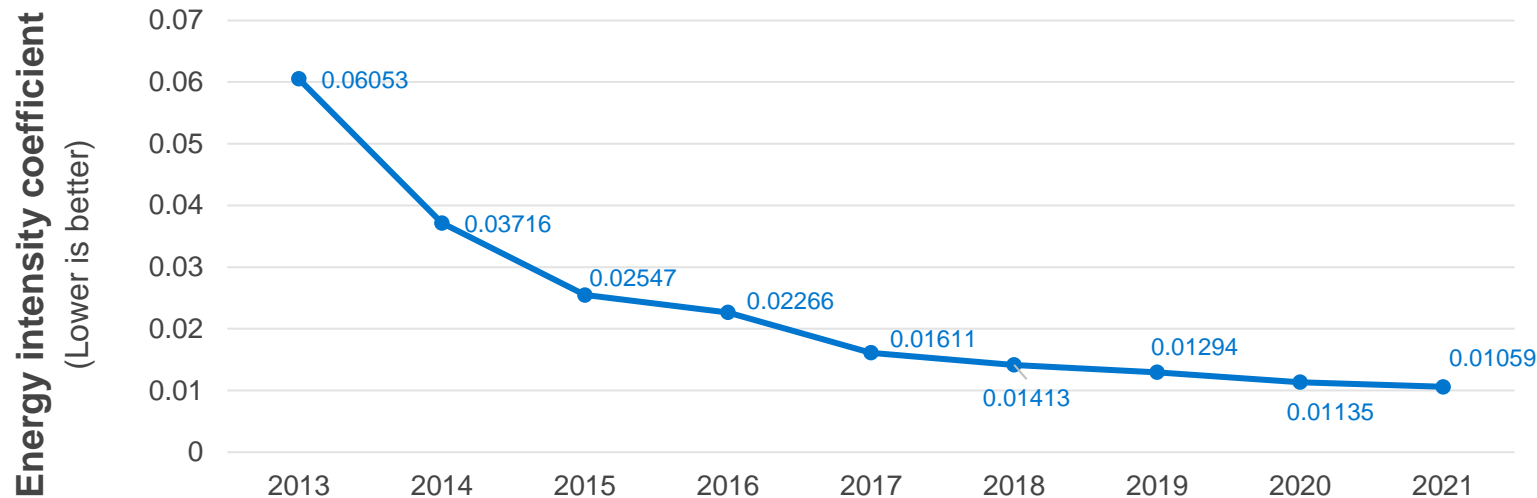
*Based on internal analysis, April 2021

효율성을 위한 설계

Power Efficiency

Making our technology more efficient and keeping them cool reduces energy waste helping your organization reduce their datacenter's carbon footprint, as well as our own. Innovations in power management, thermals and processor improvements increased the energy efficiency of PowerEdge while dramatically reducing their energy intensity.

Energy intensity
Comparing Legacy PowerEdge Servers to Current PowerEdge Servers

Energy intensity coefficient (Lower is better)

Year	Value
2013	0.06053
2014	0.03716
2015	0.02547
2016	0.02266
2017	0.01611
2018	0.01413
2019	0.01294
2020	0.01135
2021	0.01059

PowerEdge servers have reduced their Energy Intensity (EI) by 83% over the past 8 years

Efficiently addressing cooling

High- performance fans and new CPU heatsinks keep the system at optimal temperatures without using more energy than is needed to do so.

Power management

OME Power Manager gives you ultimate control with automated power and thermal management

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델 스토리지의 지속 가능성

에너지 효율

Dell is committed to improving energy efficiency in our storage portfolio with each generation.

열과 냉각

By helping systems maintain their optimal operating temperatures with our Adaptive Cooling technology by reducing energy wasted on powering and cooling your equipment.

인프라통합

Innovations in flash storage, data deduplication, and compression enable you to reduce your hardware needs and save energy, all while reducing your physical and carbon footprint in the data center.

PowerMax is

40%

more energy efficient*
than the previous
generation

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최적화된 냉각

열을 줄이기 위해 데이터 센터 내부의 온도를 제어하는 것은 중요한 고려 사항입니다.

Everything matters, from the efficiency and design of the CPU and the management software to the layout and design of the data center itself.

Our multi-vector cooling, liquid cooling, and thermal design capabilities are cutting-edge solutions to one of the biggest challenges in IT today.
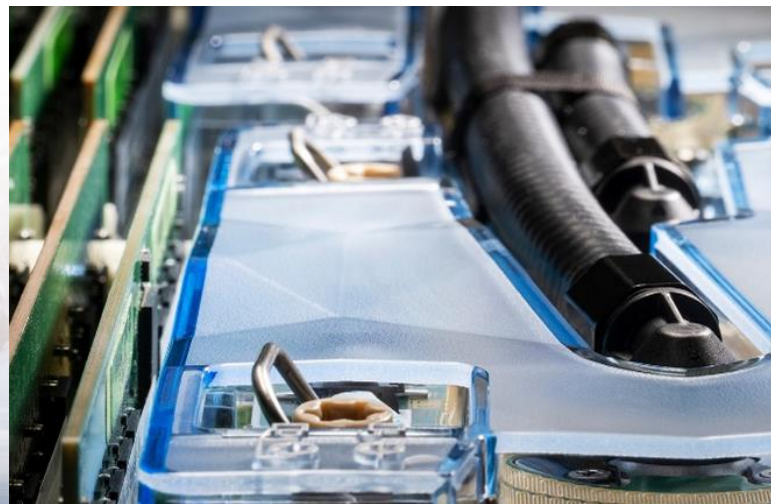
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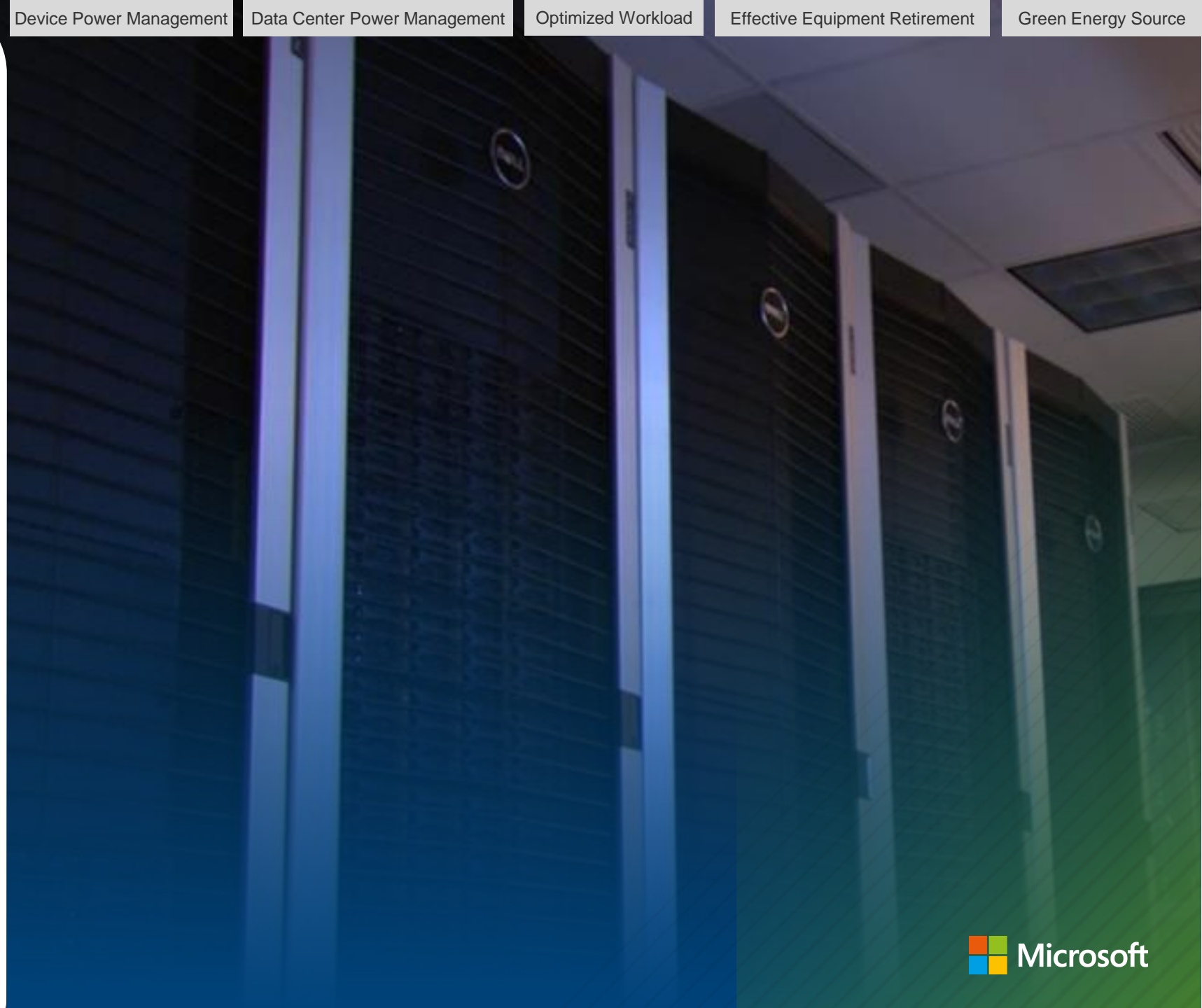
하드웨어 냉각 방식

공기 냉각

System design based on extensive modeling
Multi-vector cooling
Power and thermal management tools

직접 액체 냉각

Superior thermal management
Leak Sense technology
Forward thinking

액침 냉각

Single phase immersion
Two phase immersion
Custom solutions offered by OEM

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냉각을 위한 다양한 고려사항

열 성능

공기 냉각과 액체 냉각의 선택/조합을 통해 배기열 억제 및 집합 냉각 효율 극대화

냉각 에너지 사용을 줄이기 위해 주변 공기 사용을 촉진하는 현장 환경 전반에 걸친 공기 솔루션

필요한 경우 냉각 성능 극대화를 위해 캐비닛 또는 랙 레벨에서 액체 사용

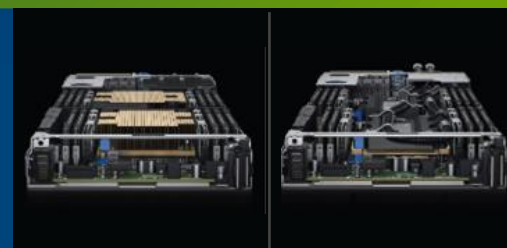**Data Center Containment**　　　　　　　　　　　　　　**Rack Containment**

Ambient Air
Maximize use of hot/cold aisle alongside Fresh Air exchangers

Fresh Air
Hardware operating >°C with air circulation systems

Direct Contact Liquid Cooling
Closed-loop flow capturing heat allow more rack density / lower power use with performance

Immersion Cooling
Immersion with rack density and increased cooling capacity (up to 95% energy reduction)

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전원 관리를 위한 지능형 플랫폼

BIOS Settings and Integrated Dell Remote Access Controller (iDRAC) help manage power usage
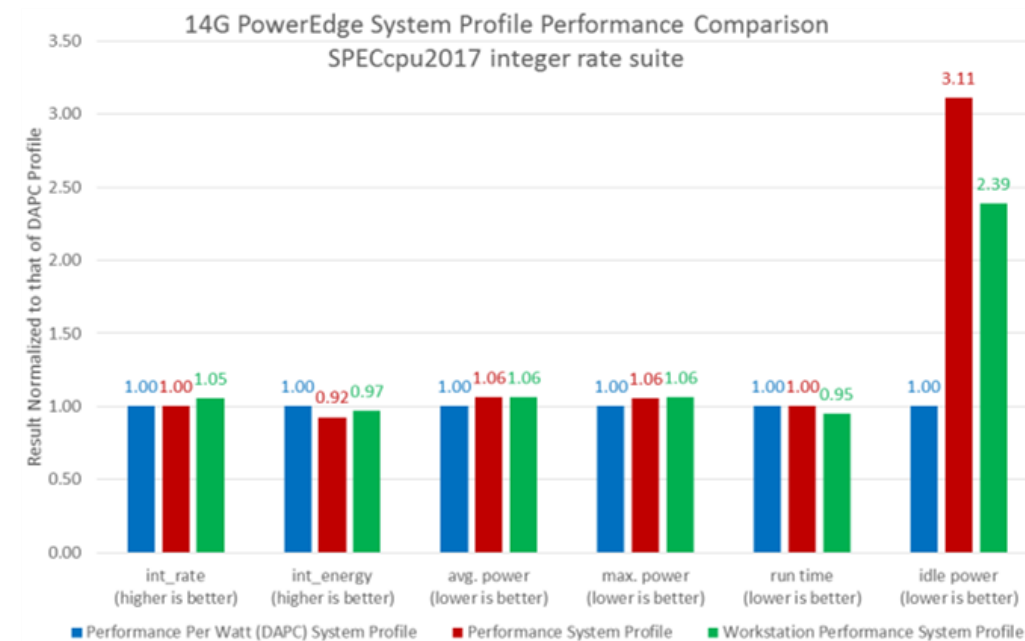
Dell PowerEdge

The BIOS Dell integrated remote access controller (iDRAC) offers control over the server's power management modes.

- Leveraging these built-in platform features can:

- Reduce power consumption for any given workload

- Save energy, especially on applications used infrequently

- Reduce power consumption by automatically adjusting the speed of the CPU based on usage (or disable when idle)

Conclusions

- The Performance Per Watt (DAPC) System Profile offers the best overall energy efficiency and lowest idle power consumption

- The Performance System Profile consumed 8% more energy over the benchmark run for no measurable improvement in compute throughput and at the cost of 3x the idle power consumption

- The Workstation Performance Profile provided 5% improved compute throughput and also 5% reduced execution time over the other two profiles at the cost of 3% higher energy usage and 2x the idle power consumption

14G PowerEdge System Profile Performance Comparison
SPECcpu2017 integer rate suite

Result Normalized to that of DAPC Profile

int_rate (higher is better): 1.00 1.00 1.05
int_energy (higher is better): 1.00 0.92 0.97
avg. power (lower is better): 1.00 1.06 1.06
max. power (lower is better): 1.00 1.06 1.06
run time (lower is better): 1.00 1.00 0.95
idle power (lower is better): 1.00 3.11 2.39

■ Performance Per Watt (DAPC) System Profile ■ Performance System Profile ■ Workstation Performance System Profile

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데이터 센터 전원 관리: OME Power Manager

Gain the insight you need to reduce your carbon footprint and cut operational costs

에너지 효율

Reduce power consumption during off-peak hours with policy automation to place power caps

열과 냉각

Identify issues on individual servers or racks and address it before it creates an SLA impact

인프라 통합

Gain ultimate control with automated power & thermal management that lets you know who consumes power with detailed historical reports

OpenManage Enterprise

With Power Manager you can manage your energy resources while maximizing uptime.

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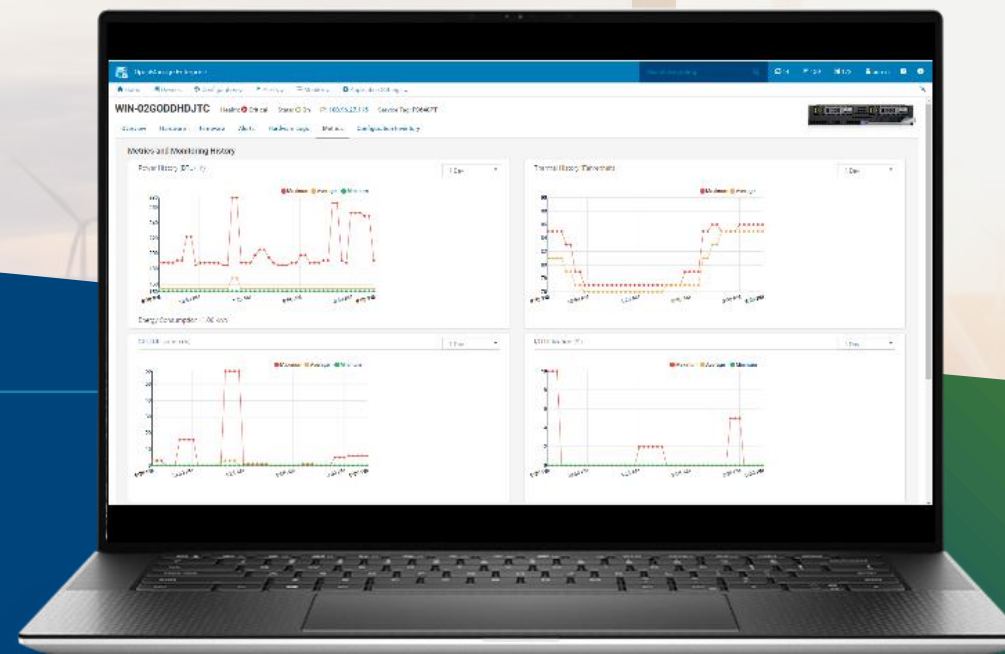
혁신적인 비즈니스 모델을 통해 워크로드 관리 및 지속 가능성 추진

구독 및 as-a-Service 모델은 IT 환경의 적정 규모를 조정하여 효율성을 높이고 자원 낭비를 줄이는 데 도움이 됩니다.

Pay only for what you use

With the ability to scale up when needed, reduce overprovisioning which could help reduce emissions and resources. APEX provides up to 34% reduction on over-provisioning capability and can dramatically reduce the cost of wasteful overprovisioning by as much as 45%.

Offload lifecycle management

Dell responsibly reuses, repurposes and recycles technology on your behalf, increasing residual value of your equipment for future use and removing the burden of end-of-life management. By having APEX manage infrastructure lifecycle, customers can save up to 53% of time spent on decommissioning and retiring hardware.

Host your data in colocations powered by renewable energy

With the option for APEX solutions to be housed in colocation facilities powered by 95% renewable energy, firms may be able to reduce their carbon footprint and contribute to their organization's sustainability goals.

71% of firms say they need a partner to accelerate their programs and achieve their sustainability goals*

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책임있는 자산 폐기

Asset Recovery Services

Dell의 자산 복구 서비스는 기업 고객이 브랜드에 관계없이 IT 장비를 안전하고 책임감 있게 폐기할 수 있도록 지원하여 향후 구매에 사용할 수 있는 가치를 창출하도록 돕습니다.

We leverage our long-standing security expertise, environmental compliance and commitment to sustainability to help customers seamlessly transition from old to new technology while protecting what's important.

Key benefits include:

- Secure your sensitive and important data to ensure it doesn't fall into the wrong hands
- Responsibly recycle e-waste and address your company's environmental compliance requirements
- Reinvest value from aging equipment to help your business grow
- Convenient control and insight through an online customer portal

We have collected **2.6+**[*] **billion pounds** of used electronics for reuse or recycling since 2007.

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*1.2 billion kilograms

재생 에너지에 대한 고려

Green Data Centers

태양광, 풍력 등 신재생에너지를 주로 이용하고 에너지 효율을 극대화하고 탄소 발자국을 최소화하도록 설계된 기술을 활용하는 데이터센터

When a data center is connected to a grid with
a varying mix, operators currently have two options:

1. Purchase offsets by making payments to initiatives to equal your total emissions

2. Source renewable energy, even if those sources are elsewhere on the grid (or even in different countries)

As part of our climate action goals, Dell Technologies is committed to sourcing
75% OF ELECTRICITY FROM RENEWABLE SOURCES
across all Dell facilities by 2030 – and 100% by 2040.

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*1.2 billion kilograms

Partner with us

Sharing our expertise and resources with our customers is a privilege
and a responsibility, ensuring we are all empowered to achieve
our sustainability goals and reduce our impact on the planet.

Our people, partners, & customers

Visit our product sustainability page

for more information or to connect with a sales representative

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현대적이고 효율적인 하드웨어 구성

Dell Technologies의 데이터 센터 솔루션은 에너지, 열 및 전반적인 성능의 혁신을 통해 와트당 높은 성능을 제공하도록 설계되었습니다.

최적화된 열과 냉각

델은 최적화된 냉각 및 전력 기능을 갖춘 하드웨어를 설계합니다.

효과적인 장치 전원 관리

Dell Technologies 서버는 에너지 낭비를 줄이기 위해 BIOS 및 iDRAC 설정을 내장했습니다.

관리형 워크로드 분산

델 솔루션은 온-프래미스 및 클라우드에서 워크로드를 관리할 수 있도록 지원합니다.

영리한 데이터센터 전원 관리

OME Power Manager는 탄소 배출량을 줄이는 원격 측정 기능을 제공합니다.

책임있는 자산 폐기

Dell Technologies 회수 및 재활용 프로그램을 사용하면 책임감 있게 장비를 폐기할 수 있습니다.

녹색 에너지원

Dell Technologies은 2040년까지 탄소 발자국을 크게 줄이는 100% 재생 에너지로 가는 길을 걷고 있다..

DELL TECHNOLOGIES IS
YOUR PARTNER ON THE PATH TO A

Green Data Center

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