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From insight to action: concrete solutions for energy efficiency in IT

Awareness of energy consumption in IT is growing. The challenges are clear: AI and high-performance computing (HPC) are guzzling energy, data centers are getting bigger, and sustainability is becoming a critical factor for both cost savings and regulation. But how do we translate this awareness into actual action? In this follow-up article, we will dive deeper into concrete solutions to improve energy efficiency in IT.

1. Power management: the low-hanging fruits

Many IT environments leave huge savings opportunities untapped due to inefficient energy management. With relatively simple measures, immediate gains can be made:

- **Advanced power management settings:** Modern CPUs and GPUs have power-saving modes. By properly tuning settings such as Dynamic Voltage and Frequency Scaling (DVFS), up to **40% energy savings** can be achieved without loss of performance.

- **Automatic workload scalability:** Automatically distributing workloads and putting servers in lower power modes when they are less active prevents unnecessary consumption.
- **Energy-Aware Job Scheduling:** Jobs can be scheduled to run at times when renewable energy sources (such as solar or wind power) are optimally available.

2. Hardware: energy-efficient components and architectures

The right choice of hardware has a huge impact on energy consumption:

- **ARM-based processors:** ARM chips consume less power than traditional x86 processors and are becoming more powerful, making them an energy-efficient option for cloud and edge computing.
- **Specialized AI Chips:** AI accelerators such as TPUs (Tensor Processing Units) and FPGAs (Field Programmable Gate Arrays) can run AI workloads more efficiently than traditional GPUs. This leads to lower energy consumption per calculation.
- **Solid State Drives (SSDs):** SSDs consume less power than HDDs and increase the efficiency of data storage and processing.
- **Energy Efficient Ethernet (EEE):** This protocol reduces the energy consumption of network equipment when traffic is low.

3. Cooling: the silence revolution of direct liquid cooling

Cooling is one of the largest energy consumers in data centers. Traditional air cooling has its limitations, but new technologies bring revolutionary improvements:

- **Direct liquid cooling:** By cooling components directly with liquid, the energy consumption for cooling can be up to **90% lower** than air cooling.
- **Immersion cooling:** Servers are immersed in a non-conductive liquid that dissipates heat much more efficiently than air, dramatically reducing the need for conventional cooling.
- **Heat recovery:** The residual heat from data centers can be reused for district heating or industrial processes. This not only reduces energy consumption, but also contributes to circular energy solutions.

4. AI-Driven Energy Management: Smart Automation

AI itself can contribute to energy efficiency in IT by optimizing energy management:

- **Predictive Analytics:** AI algorithms can predict energy consumption and automatically optimize systems before waste occurs.
- **Automatic adjustments to cooling systems:** AI can monitor temperature sensors and workloads and adjust real-time cooling strategies.

- **Self-healing Infrastructure:** AI-based monitoring can detect problems and reconfigure systems to prevent unnecessary energy consumption and outages.

5. Regenerative IT: from disposable model to sustainable management

In addition to hardware and software optimization, a sustainable approach to IT equipment is essential:

- **Extending hardware life:** Better cooling and more efficient use allow equipment to last longer, reducing the need for replacements and reducing the environmental impact.
- **Refurbishing and circular IT:** Reusing components and using refurbished hardware reduces the demand for new production and saves energy in the chain.
- **Recycling Ewaste:** Correctly recycling old hardware prevents environmental pollution and allows for the reuse of rare raw materials.

6. From compliance to competitive advantage: the role of regulation

Energy efficiency is not only a cost issue, but also a strategic advantage. Legislation such as the **Corporate Sustainability Reporting Directive (CSRD)** forces companies to make their energy consumption more transparent. This offers opportunities:

- **Advantage through proactive adaptation:** Companies that invest in energy savings now not only comply with future regulations, but also reduce their operational costs.
- **Supply chain responsibility:** Large companies will ask their suppliers for energy data. Those who respond well to this can distinguish themselves as a sustainable partner.
- **Financial incentives:** Governments offer subsidies and tax breaks for energy-efficient IT investments.

From awareness to action

The technology and strategies for energy efficiency in IT are available – now is the time to apply them widely. Through smart hardware choices, relevant data monitoring, AI-driven optimization, advanced cooling technologies, and sustainable IT management, businesses can **save up to tens of percent of energy** without sacrificing performance.

The IT sector can be a pioneer in the energy transition. It starts with a simple step: Just Do IT!