



ECOoptimization Service

Identifying Energy savings and cost reduction in your Data Center



ECOoptimization Service

- Best practises for making your Data Center Greener.
- Energy consumption cost reduction means MONEY SAVINGS.
- Measure, analyse, Data Collection and implement solutions.

AST, with a wide experience in more than 300 Audits and Consulting Services in Data Centers and mission Critical Sites worldwide will analyze the current state of your Data Power Consumption and Cooling System, according to:

- Applicable international standards (TIA 942, ISO 17799, etc.).
- Real needs of the room to guarantee redundancy and continuity.
- Best industry practices.

The goal is to verify the optimum approach of the Data Center configuration Cooling and Power Systems, in order to minimize Power Consumptions in the Data Center.

IDEAL FOR



Improve Data Center efficiency



Actions to implement in short/mid term



Reduce Data Center energy consumption

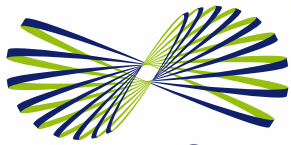


Fast Return On the Investment

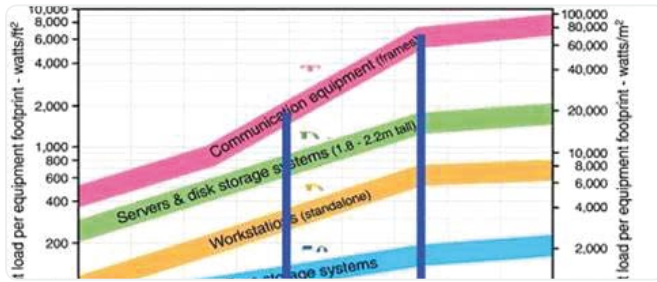
WHY ECOOPTIMIZATION IN DATA CENTERS?

A Data Center is an evolving working facility during its whole operational life whole year. This means a countinuous and non-stop power consumption of all IT equipment, air conditioning machines, ligthing..etc, so any improvement implemented on power savings will revert money in money savings.

Using specialized measuring equipment, AST will identify all weak points in your data Center and recommend all actions that will improve your Data Center resilyency and decrease energy.



ECOOPTIMIZATION SERVICE



HELPING TO MAKE YOUR DATA CENTER GREENER...HOW?

AST will measure and analyse from your DC, all systems that can be optimized :

- IT Room Architectural (Room location and conditions, Thermal insulation, etc).
- Cooling system (A/C technology used, Temp.& R.H, air flow measurements Thermal and airflow distribution, Raised floor cables organization, Thermal and Humidity distribution map design,...etc).
- Power and UPS Efficiency (electrical consumption, energy quality analysis, UPS efficiency,..etc).

DO YOU KNOW THE REAL ENERGY CONSUMPTION COST IN YOUR DATA CENTER?

- Have you ever calculated the annual consumption cost?
- Do you know the consumption cost of the IT equipments?
- Do you know the consumption cost of the air conditioning system?
- Do you know the power loss from UPS and Cooling systems due to inefficiencies?
- Do you know how a bad distribution under the raised floor can affect the cooling efficiency?

AST provides you answers to all these questions!

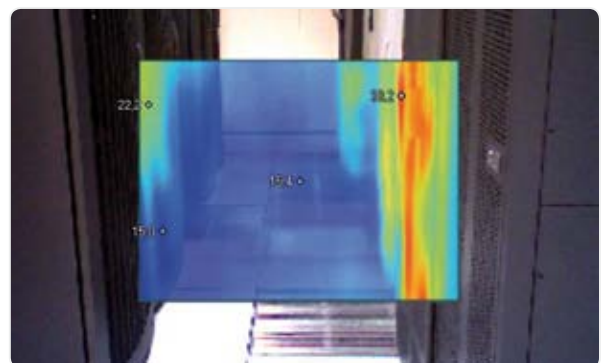
PROVIDING ADVICE AND SOLUTIONS

AST will give you all recommendations based in GREEN best practises:

- Cooling improvement servers by enclosing the cold aisle.
- Efficient layout: Hot and Cold aisles distribution implementation and under raised floor cabling re-distribution.
- Modular Scalable Data Center: avoid over-building and over-spending.
- Equipments (Cooling and UPS) Efficiency.

A complete report will be delivered with a summary of main problems identified and their solution. ST will check possible use of renewable energies and study potential and study potential freecooling implementation study and its ROI.

We will calculate the PUE (Power Usage Effectiveness) for the Data Center before and after improvements proposed, as well as the economic savings.





ECOOPTIMIZATION SERVICE

Case Study:

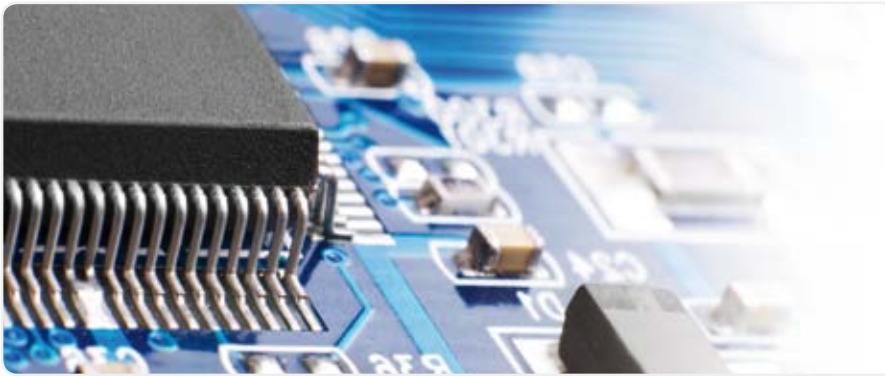
Data Center 60 m²
Location: Oslo (Norway)
Sector: Automotive Company
Savings: 10,41kW x € 0,1kW/h x 24h x 365 days = 9.118 € / year
ECOoptimization Audit pay back: less than 8 months.

Concept	Case 1		Case 2	
	Cost Saving	Installation Cost	Cost Saving	Installation Cost
Increasing CRACs temperature point to 24°C	8%	-	8%	-
Increasing chilled water temp. to 10/15°C	8%	-	8%	-
Install CRACs with variable speed fan Investment amortization in 8 years	8%	19.500 €	8%	19.500 €
Reduce Data Center surface Investment amortization in 10 years			5%	36.000 €
Smart Shelter + enclosure Investment amortization in 20 years				
PUE	1,56		1,55	
TOTAL COST SAVING (€/year)	9.118 €	19.500 €	9.867 €	55.500 €
ECO audit PAYBACK (months)	7,9		7,3	
Investment PAYBACK (years)	2,1		5,6	
ROI	47%		18%	



HARDWARE CLEANING

Extend the operational life of your hardware



Hardware Cleaning

Specialized and professional cleaning of harmful particles inside servers, networking and electronic equipment.

IT equipment due to air flow accumulates in time pollutants and dirtiness inside the hardware above Standard recommendations (ISO 14644-1). This dirtiness (dust or metal particles) are cause for hardware overheating, excess energy consumption and are an important fire hazard.

BENEFITS

- Extend the operational life of equipment installed in Data Centers, avoiding avoiding pollutants that stress them.
- Minimize the risk of fire because of dust accumulation in the hardware.
- Avoid electrostatic discharges which result in hardware damage and transmission failures.
- Remove ferric materials particles (oxide particles, zinc whiskers).
- Minimize hardware failures.
- Minimize air pollution.
- Eliminate biological contaminants.
- Avoid Hardware cleaning by not qualified staff that can cause system's breakdown and trouble shooting.
- Maintain the environment of the Hardware without contaminant particles.

IDEAL FOR



Extend the operational life of equipment



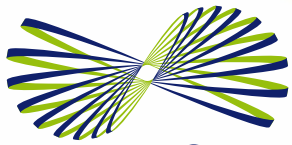
Eliminate contaminants



Minimize failure risk



ISO 14644
Air Quality



ASTModular

SERVICES

HARDWARE CLEANING



APPLICATIONS

DATA CENTERS in order to comply with:

- ISO 14644 Air Quality Cleanliness.
- IEC 61340/5/1 Electro Static levels.

TECHNICAL SPECIFICATIONS

Decontamination of the electronic equipments components with environmentally controlled chambers using:

- Portable Clean Room from AST.
- High-Efficiency Filtered Compressed Air.
- High-Efficiency Filtered Vacuums.
- ESD Protection & Environmental Control.

Complete pictures and reports based report of all tasks performed during the cleaning service showing situation before and after AST job.





IT CARE

Leave your Data Center in the hands of maintenance specialist



IT Care

AST provides the support and expertise of its engineering team in order to provide a complete Global Maintenance Service for our customer's Data Center. The main objectives and benefits of this Service are:

- Preventive and corrective maintenance plans design and implementation.
- Maximize the Data Center performance (infrastructure) to guarantee levels of maximum reliability.
- AST undertakes the whole Data Center infrastructure maintenance:
 - Power (AC Network, grounding system, UPS, generators,...).
 - Electromagnetic fields (interferences that may affect the computer based systems).
 - Environmental Quality (air conditioning system, air purity...).
 - Security (DC access, fire, flooding, human mistakes...).
 - Provide a complete Monitoring System.
- "Hotline" 24/7 for immediate attention.
- Continuous improvements to optimize reliability and optimize costs and energy consumption.
- Monthly reports of Preventive and Corrective actions.
- Emergency Service 24/7/365 at national scale with corrective actions in less than 4 hours (depending on equipment-type and location).
- Focus ALL maintenance responsibility in one single point (AST) that coordinates all the preventive actions and corrective repairs in the Data Center, simplifying operations for the customer.

IDEAL FOR



Maximize the Data Center performance



Single point of contact for the customer



Hotline attention 24/7



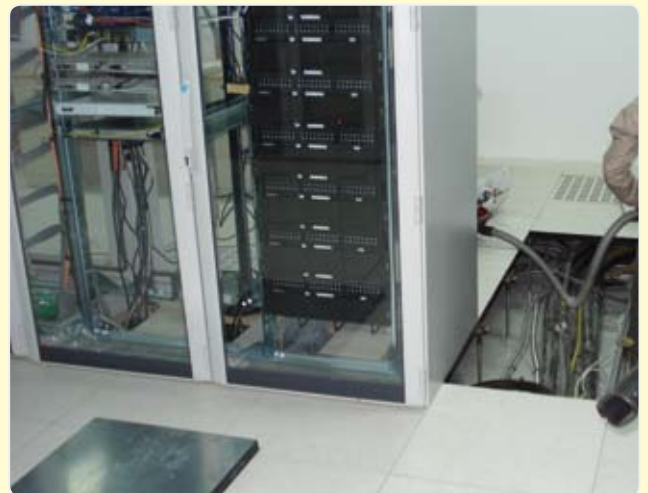
Periodical reports

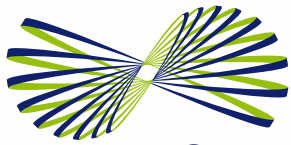


IT CARE

TECHNICAL SPECIFICATIONS

- I.T. Check Service (annual Data Center audit).
- Technical Cleaning.
- Procedures Manual.
- Preventive and Reactive Maintenance Contracts (UPSs, HVAC, Fire Protection System, Diesel Motor Generator, Transformers, Access Control) with defined response time and SLA.
- Electrical Maintenance.
- Remote Monitoring System.
- Call Center.
- Hot-Line.





IT CHECK

Minimize the risk of failure and improve the health of your Data Center



IT Check

AST, with a wide experience in more than 300 Audits and Consulting Services in Data Centers and mission Critical Sites worldwide, presents "IT Check" service. This service checks the current state of a Data Center, its potential points of failure and areas of improvements. Its performance measured against various benchmarks:

- Applicable international standards (TIA 942, ISO 17799, ...).
- Reliability and availability.
- Best industry practices.
- Tier level Vs. Real needs of the business.

IDEAL FOR



Pro-active prevention



Minimize the risk factors



Verify and control the Data Center health



According standards

BENEFITS

The goal is to test and measure the parameters that may affect the performance of the Data Center, in order to detect any possible risk. With this test is intended to:

- Minimize the risk factors that can affect the performance of Data Centers or cause a systems breakdown.
- Pro-active prevention of possible problems and risks.
- Centralize the responsibility of the Data Center Maintenance.
- Verify and Control the Data Center conditions always applying the International Standards.
- Withdraw from client the maintenance, management and risks of the Data Center.
- Continuous improvement on the Data Center infrastructure.
- Improvement of:
 - Availability (Data Center break down prevention)
 - Reliability (Minimize the risk factors that may affect the optimum performance of the Data Center)

The IT check Service is not limited just to collect data, but to identify problems and offer the right SOLUTIONS, as well as giving a qualification of the Data Center regarding the compliance of international standards.



ASTModular

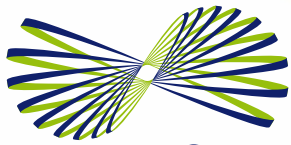
SERVICES

IT CHECK



STANDARDS ANALYZED

- IEC 61340-5-1
- IEC 50014
- IEC 50160
- IEC 50022
- IEC 50173
- MIE-REBT
- ISO 17799
- TIA/ANSI 942
- ISO 14644
- IEC 61000-3-3
- IEC 61000-4-3
- IEC 61000-4-8



IT CHECK

TECHNICAL SPECIFICATIONS

IT Check service is provided in 6 different chapters:

1 Power Quality

- AC power events at main Switchboard and Data Center Switchboard:
- Electrical system dimensioning analysis: UPS, engine generators, etc. (redundancy)
- Thermography: switch boards analysis (connection points), buss-bar and specific machines.

2 Electromagnetic Fields

- Electrical and Magnetic Fields: Measurements at high and low frequency in different points of the Data Center.

3 Environmental Services

- HVAC (Air conditioning) measures on DC's critical points (temperature, humidity, air speed, air flow).
- Measures in critical Racks (temperature and airflow).
- DC cleaning analysis: Check cleaning condition of raised floor, tiles, ceiling, racks, etc.
- Air purity: micro-particles analysis of the room.
- Air Filters check.
- Room Thermography analysis: humidity condensations, Data Center isolation, cool air leakage of critical points.
- Data Center Equipments and Racks layout analysis: To optimize layouts that will improve Data Center efficiency.
- Systems and Servers Heat dissipation.

4 Operation Security

- Check the existence of a DC's Procedures-Operations Manual.
- DC's Access System Evaluation.
- Check the location of switches, computers, routers, HVAC equipment, etc.
- Check the protections of switches at power boards.
- Fire protection system evaluation.
- EPO.

5 Structural Security

- Site location and associated potential risks.
- Architectural structure.
- Anti-vandalism and intrusion.
- Fire resistance and protection:
- Gas tight
- Water protection:
- Thermal stability

6 Data Network Analysis

- Cat compliance.
- dB loss.
- Next, Fext and other parameters.





Data Center

STRATEGIC DESIGN CONSULTANCY

Design services for modular and energy efficient Data Center aligned with your organization needs, focused to optimize ROI



Strategic Design Consultancy

Data Centres must be able to grow as per the requirements of the business they support.

Not all applications require same Tier levels. Data Center needs aligned with the business strategic plan and goals, the systems architecture they must support and its growth phases forecast.

AST applies all its large experience in Data Centers in order to help organizations to identify their real long-term.

Data Centers are a "services unit" for organizations, therefore they must blend maximum availability at the minimum cost.

Design criteria are based upon International standards (TIA 942), Scalability, Modularity and Energy Efficiency.

BENEFITS

The main goal of this service is to conduct a Consultancy Service starting from the business strategic plan down to current servers (low or high power density) and growth expectations in mid/long term.

AST designs are modular and efficient Data Center solution, specifying the internal layout and equipments power dimensioning according to growth expectations, as well as PUE, etc...

IDEAL FOR



New Data Center solution: Modular and Secure



According customer growth expectations



Energy Efficient Design



Definition of budget and project plan



STRATEGIC DESIGN CONSULTANCY

TECHNICAL SPECIFICATIONS

The consultancy document will include a conceptual new DC design proposal including blueprints, 3D drawings, internal layouts and equipments power calculations. The Consultancy Document will include:

Conceptual definition

- Information collection and analysis.
- Business needs and Data Center growth plan in next 10 years by phases.
- Possible location audits.
- Building functional review.
- Technology and equipment definition.
- Total building capacity review.
- Risk assessment and Security requirements.
- Power density definition and growth forecast.
- Growth levels and phases deployment review.
- Physical site & size requirements and growth forecast (evaluation of current site and alternatives).
- Tier level: redundancy and resiliency level as per TIA 942.

Building and equipment systems specification

- Power cooling and Electrical installation needs and growth forecast.
- Power levels and space needs: Transformers, Gensets, Switchboards, ...
- Power and Cooling circuit Synoptic diagrams preparation.
- Cooling technology and resiliency levels: type, space, needs, location, ...
- Architectural impact: concrete slab weight/m², floor height, shaft dimensions, elevators, ...
- Equipment access routes review.
- Security levels: fire protection, water tightness, ...
- Fire detection and extinguishing.
- Security systems: CCTV, access, control, ...
- Environmental conditions (building site, location).
- Energy efficiency analysis (structure, racks distribution, etc.).
- Applicable Standards review.

Budgeting

- Support and supervision of detailed budgeting phase.

Planning

- Preliminary project plan.

Detailed Design Support

- Support and supervision on the detailed design Engineering phase.
- Support and supervision on the preparation on tender document.





TECHNICAL CLEANING

Keep your Data Center clean for improved Security and Energy Savings



Technical Cleaning

Very frequently Data Centers ambience have a high level of harmful particles above the standard limit (ISO 14644-1). AST provides professional cleaning services of Data centers "on hot", done by qualified staff and with special non electrical conductive cleaning products with no downtime risk for the installation.

Dust particles accumulate in hardware cooling fans, causing overheating that may result in fire risk and hardware accelerated aging.

Also can decrease communications speed up to a 40%, as they may accumulate in Fiber optic connectors.

BENEFITS

- Increase the operational life of the equipment installed in the rooms, avoiding that contamination corrupts them.
- Minimize the risk of fire because of dust accumulation in hardware fans.
- Avoid electrostatic discharges which come into transmission failures.
- Avoid ferric materials (oxides).
- Minimize the mechanical waste and hardware failures.
- Minimize air pollution
- Eliminate life contaminants
- Avoid DC's cleaning by not qualified staff that can cause system's breakdown and trouble shooting.
- Maintain the environment of the DC without contaminant particles.
- Maintain communications network up to speed.

IDEAL FOR



Professional Data Center cleaning



Air particles measurement



Specialized technicians



ISO 14644 Air Quality



TECHNICAL CLEANING



APPLICATIONS

- ISO 14644 - Air Quality Cleanliness
- Data Centers of any organizations.

TECHNICAL SPECIFICATIONS

Consisting on an exhaustive cleaning of:

- Raised Floor (including supports and traverses, data cables, energy cables, cable trays, data box connection, energy box connection, raised floor, structure).
- Raised Floor Plates (upper, below and side parts).
- HVAC: air filters cleaning.
- Sock micro-particles.
- Cleaning the air conditioning grills and air conditioning ducts with special products
- Walls: Sock micro-particles.
- Cleaning the complete surface with special products.
- Racks and Hardware (external).





TECHNICAL CLEANING

- External and internal sock of the racks, without damaging any connected equipment.
 - Dry cleaning of the critical points.
 - Cleaning components with special products.
 - Cleaning the rack (including the door and window) with special products.

Air particles measurement before and after the cleaning.

Complete report with pictures and particles measurements results.

The activity is performed by specialized technicians, which have been trained considering the high sensibility of the equipment inside Data Centers "on-hot" (computers, data cables, patch cords, switches, HVAC, UPS, etc).





Data Center

TIER LEVEL CHECK

Do you know the availability level of your Data Center?



Tier Level Check

The main goal of this Service is to check the Tier level of the Data Center according TIA-942 standard, in order to analyze its availability and detect any possible weak point and risk of hardware.

AST engineers will perform an on-site visit to customer facilities and will develop a technical report with the purpose of:

- Minimizing the risk factors that can affect the performance of Data Centers or cause a systems breakdown.
- Pro-active prevention of possible problems and risks.
- Recommendations of actions and best practises in order to improve the Data Center:
 - Availability (Data Center downtime prevention).
 - Reliability (Minimize the risk factors that may affect the optimum performance of the Data Center).

IDEAL FOR



Improve Data Center availability



Minimize the risk factors



Improve TIER level



According to TIA-942 Standard



TIER LEVEL CHECK

TECHNICAL SPECIFICATIONS

	TIER I	TIER II	TIER III	TIER IV
Telecommunications				
Diversely routed access provider entrances maintenance holes with minimum 20 m separation	no	yes	yes	yes
Secondary Entrance Room	no	no	yes	yes
Architectural				
Proximity to airports	no requirement	no requirement	Not less than 1.6 km	Not less than 8 km
Fire resistive requirements Interior computer room partition walls	Code allowable	Code allowable	1 Hour minimum	2 Hour minimum
Floor loading capacity	7.2 kPa (150 lbf/sq ft)	8.4 kPa (175 lbf/sq ft)	12 kPa (250 lbf/sq ft)	12 kPa (250 lbf/sq ft)
Electrical				
Number of Delivery Paths	1	1	1 active and 1 passive	2 active
Utility Entrance	Single Feed	Single Feed	Dual Feed (600 volts or higher)	Dual Feed (600 volts or higher) from different utility substations
Generator Fuel Capacity (at full load)	8 hrs (no generator required if UPS has 8 minutes of backup time)	24hrs	72hrs	96hrs
UPS Redundancy	N	N+1	N+1	2N
PDU's feed all computer telecommunications equipment	no	no	yes	yes
Mechanical				
Indoor Terminal Air Conditioning Units	No redundant air conditioning	One redundant AC Unit per critical area	Qty. of AC Units sufficient maintain critical area during loss one source of electrical power	Qty. of AC Units sufficient maintain critical area during loss one source of electrical power
Electrical Service to AC Equipment	Single path	Single path	Multiple paths	Multiple paths
Gaseous suppression system	no	no	clean agents listed in NFPA 2001	clean agents listed in NFPA 2001
Maintenance Staff	Onsite Day Shift only. On-call at other times	Onsite Day Shift only. On-call at other times	Onsite 24 hrs M-F, on-call on weekends	Onsite 24/7