Multiple Grid Energy Consumption of Data Centres

Course: Data Integration
Philipps University Marburg

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Goals

- ➔ Analysis of energy consumption patterns of data centers
- ➔ Comparing that data with data of solar energy production patterns of a solar farm
- ➔ Identify opportunities to optimize energy usage and increase the percentage of off-grid solar energy supplied to the data centers

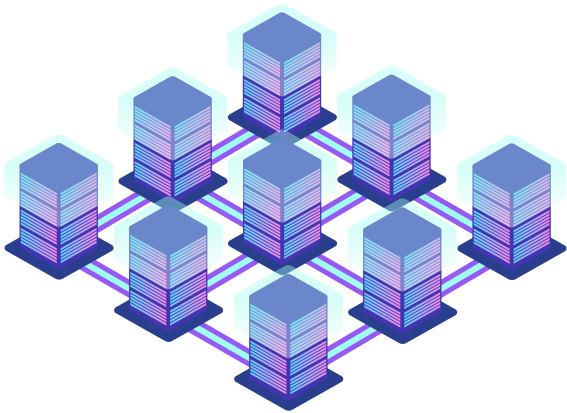
Goals

- ➔ Incorporating weather data, such as cloud cover and temperature - understanding how weather conditions affect the amount of produced solar energy

- ➔ Predict how much solar energy the data center will receive on a particular day and adjust energy consumption accordingly

Datasets

- Solar Energy Production Data
  - hourly production of solar energy from a solar farm
- Electricity Grid Data
  - information on the hourly electricity generation and consumption for different regions across the United States
- Energy Consumption Data of Data Centers
  - energy consumption data of a data center located in the United States



Optimization strategies

Utilize Renewable Energy Sources

Incorporating solar or wind energy helps reduce their reliance on traditional electricity grids

Analyze energy consumption patterns

By analyzing energy consumption patterns over time, trends and patterns can be identified that indicate areas where energy usage can be optimized

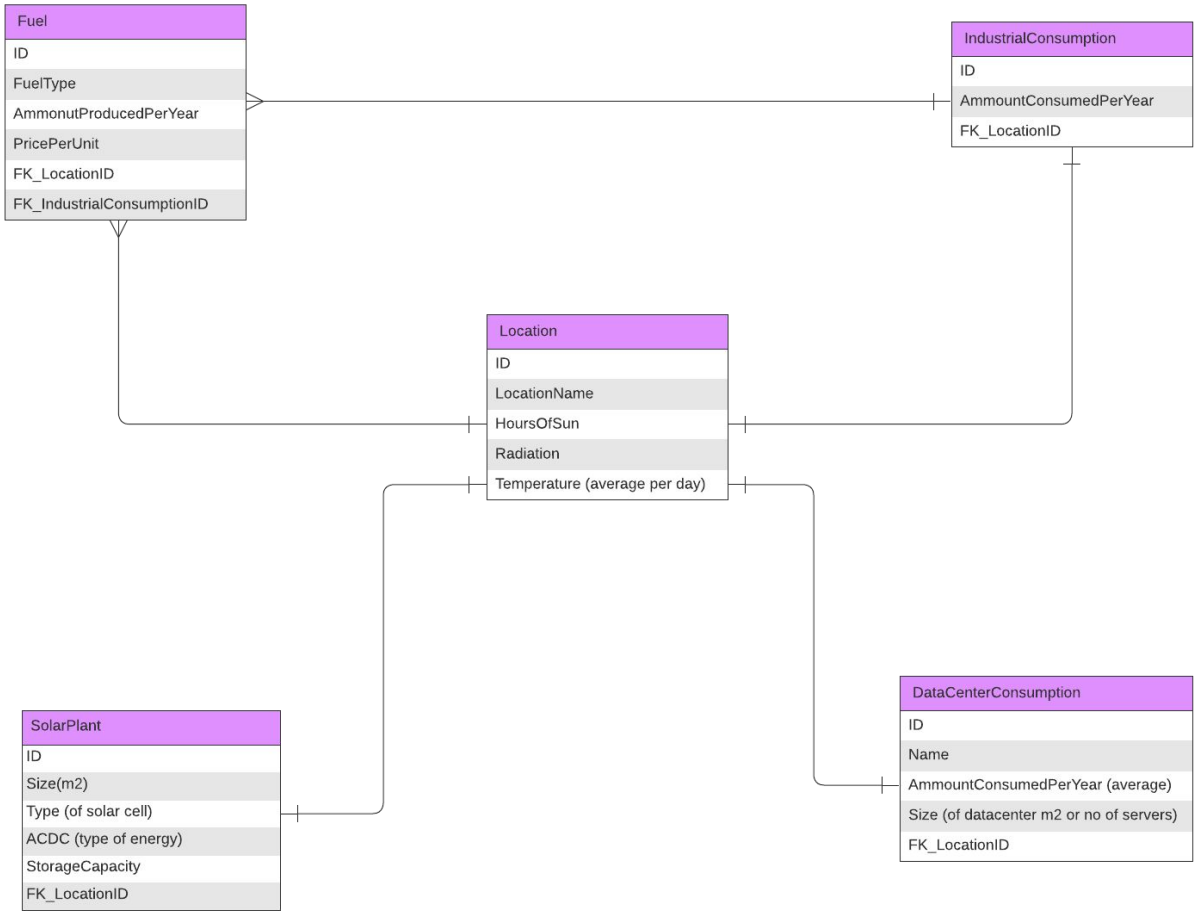
Implement Energy Efficiency Measures

By using energy-efficient servers, virtualization and cooling systems, energy consumption can be significantly reduced.This can be analyzed by datasets that provide informations on efficiency of different systems and equipment to identify improvement opportunities

GOAL

By integrating these data sets and implementing these strategies, energy usage optimization can be performed in a data center and reduce costs while maintaining optimal performance.

ERD


Fuel
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PricePerUnit
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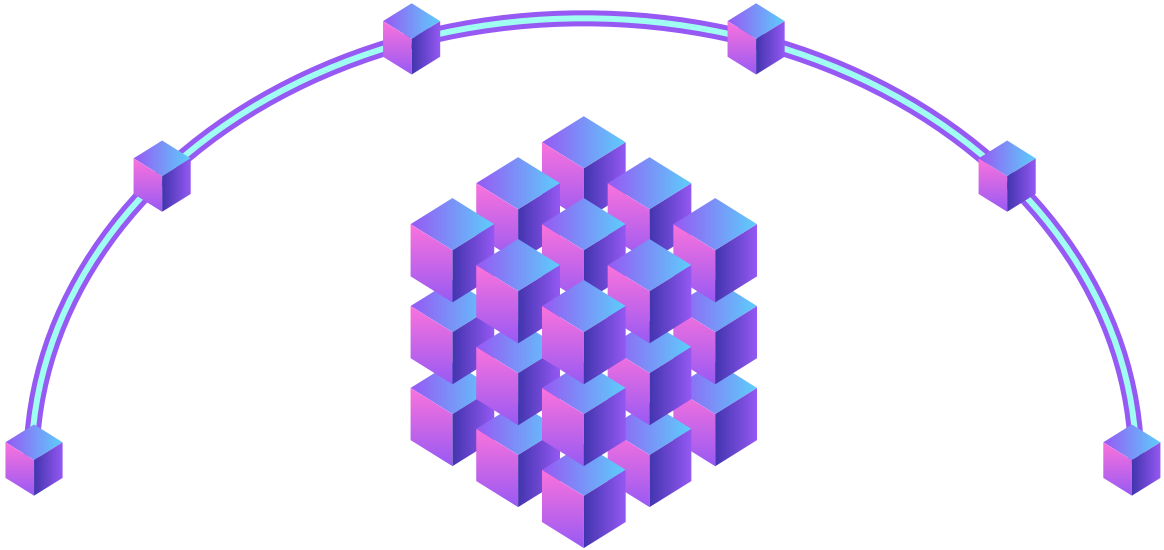
FK_IndustrialConsumptionID
IndustrialConsumption
ID
AmmountConsumedPerYear
FK_LocationID
Location
ID
LocationName
HoursOfSun
Radiation
Temperature (average per day)
SolarPlant
ID
Size(m2)
Type (of solar cell)
ACDC (type of energy)
StorageCapacity
FK_LocationID
DataCenterConsumption
ID
Name
AmmountConsumedPerYear (average)
Size (of datacenter m2 or no of servers)
FK_LocationID



Thank you for your attention!