SAMSUNG SDS

Foresee

Techtonic 2021

Partner

Disrupt

Predicting health and capacity of Infrastructure

x.Insights

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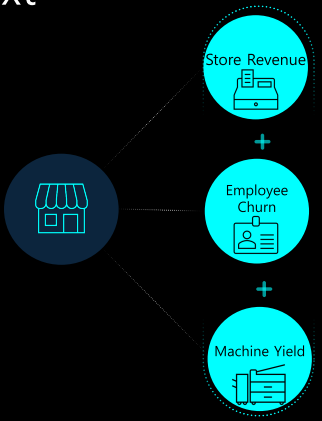
Context



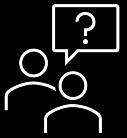
Store Dashboard

To maximize their performance, companies monitor their business assets using Key Performance Indicator (KPI)

How ever having single indicator does not give a good picture of the asset

Other indicators are added to give more information leading to dashboards and scorecards

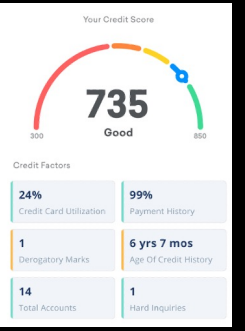
Issue



Decision makers are unsure how to combine these metrics to gain holistic view of the performance, health or capacity

- Understanding metrics most impacts performance is difficult
- Each assets have unique characteristics, that requires normalization to make the right decision
- Different decision makers have different understanding based on their experience

The Banking industry solved this problem by creating score that gives a simple way for a banker to assess the financial risk of its customers



Concept

x.Insights helps decision makers understand how well their business assets are doing through the **simple representation of a score**

Synthetize multiple metrics into a single easy-to-understand score to accelerate the assessment of the situation

+

Providing recommendations on how to improve the score leading to a better performance/health

Decision makers can then focus on improving their business by getting a **clear path for action**

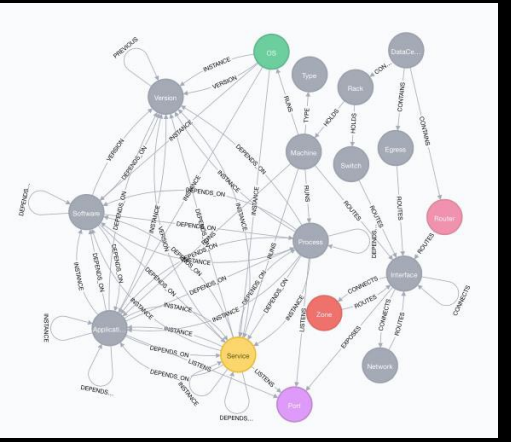
Why Use AI?

Uncover relationships that are difficult to identify and formulate

Not limited to linear relationships (like scorecard scores) but can model more complex nonlinear relationships

To take into account the characteristics of each assets and the context to provide the right assessment

Understand the weight of each metrics and factors, which may be constantly changing



What is x.Insights?

x.Insights is a data driven platform that automates the assessment of business assets using the power of AI to create a score and factors that most impact performance and health

Collect

Define KPI

Build AI Model

Build Score and Recommendations

...powered by AI

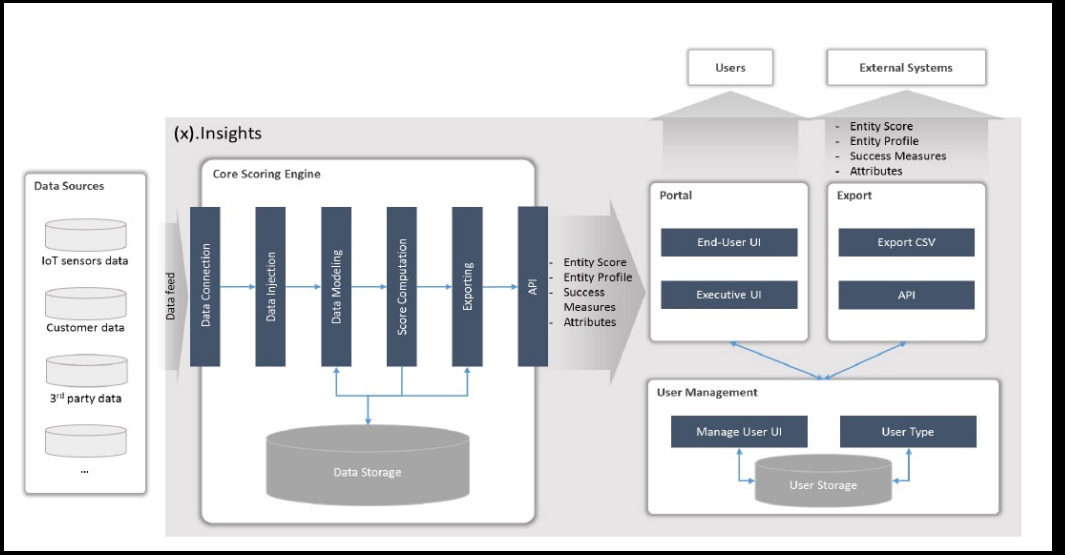
Collect and analyze metrics on multiple dimension and learns their relationship with business objectives and factors that are impacting the score and their dynamic weights of impact

Defines synthetic KPI that represents the performance/risk associated to the asset

Makes an evaluation of current KPI against all possible outcome predictions and pr esents a simple score that is health or performance index for the assets against the business objective

Build an AI model that can simulate asset s predicted outcome based on its underst anding of relationships between different metrics and synthetic KPI

Conceptual Architecture



Use Case

The CFO of a data center wants to know …

- Is the infrastructure under-utilized?
- Do we need to purchase equipment? If so, what equipment, how many items, and when?
- Can we use the existing equipment more efficiently?

CFO requires business case showing current GPU resource is fully utilized, and further expansion requests by SRA organization will pr operly support objectives over the next twelve months

Health check service report provides executive summary, highlighting current and future state forecast with actions to take

The analysis is available in **real-time, as a dashboard, with a recommendation engine** based on objective data.

Score Structure

UberScore (used to combine multiple scores – No UberScore if only 1 score

X.Insights Scores

- **Compute Score** 64%
- **Energy Score** 74%
- **Storage Score** 85%
- **Networking Score** 73%

AI Scoring Models

- Usage Trend & Uncertainty
- Usage Trend & Uncertainty
- Usage Trend & Uncertainty
- Usage Trend & Uncertainty

- Compute Score Model
- Energy Score Model
- Storage Score Model
- Networking Score Model

SIP Data Collection

Compute Usage Data

- multi-pool deployments
- container orchestration
- GPU and CPU utilization
- Read/Write latency

Energy Usage Data

- rack location
- asset deployment
- HVAC behavior
- Power distribution telemetry
- Physical security behavior

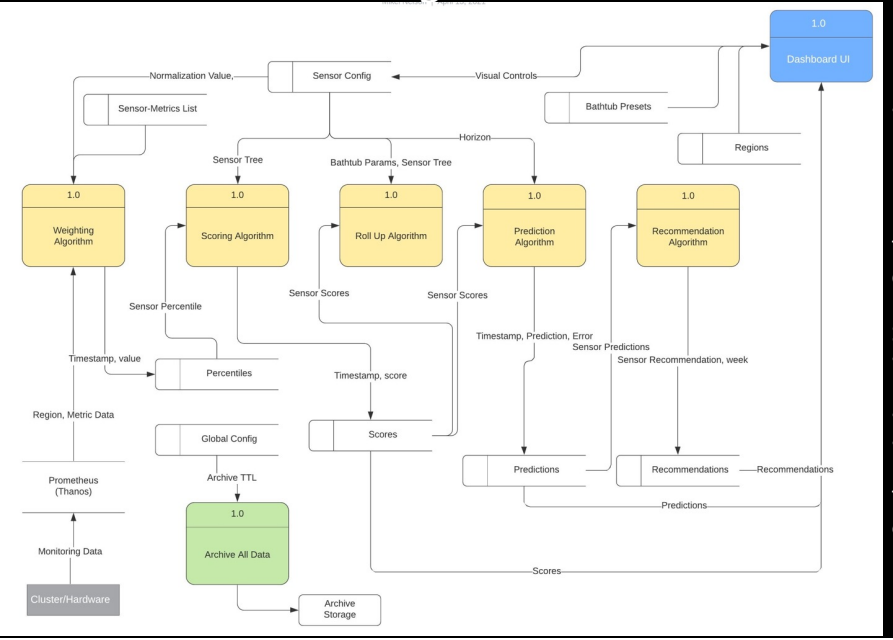
Storage Usage Data

- Available / used space
- Latency
- Policies / Quotas
- Disk Health Monitoring
- Archive

Networking Usage Data

- Bandwidth Utilization
- Latency
- Switch Activity
- Environments
- Active Links (up/down)

Data flow and Storage



From Prometheus

- Perform calculations and Store the results for retrieval by the dashboard.

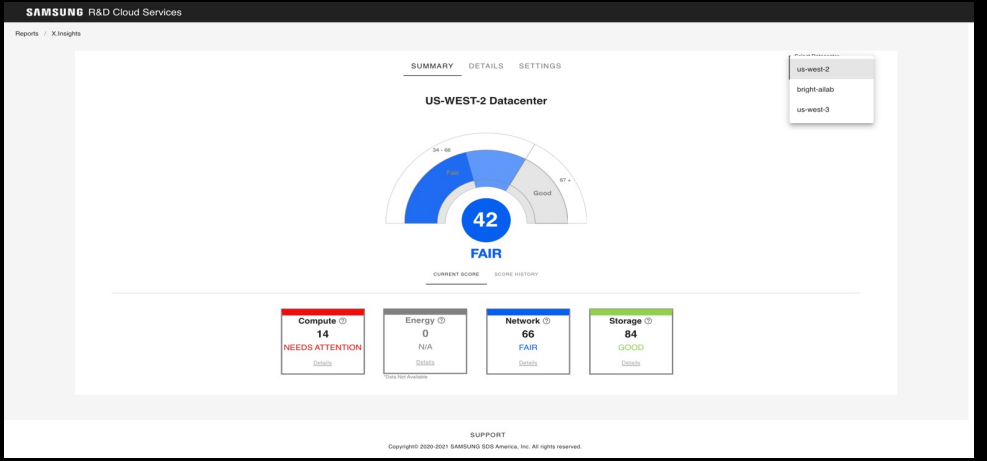
The storage is a PostgreSQL database.

Stored data

- Time-series for each component score
- Score specific options
- Global options

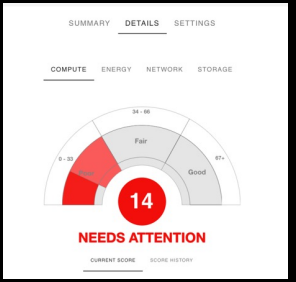
Tree structure is fixed – user cannot modify it.

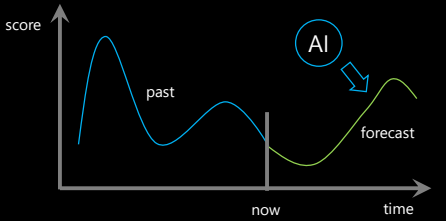
Implementation in R&D Cloud



Note: If xxx-exporter including impi-exporter are already being sent to another collector like solarwinds or nagios, x.Insight can run an exporter there to access metrics

Each Score Dashboard





Action:
- No purchase needed within 3 months. AI

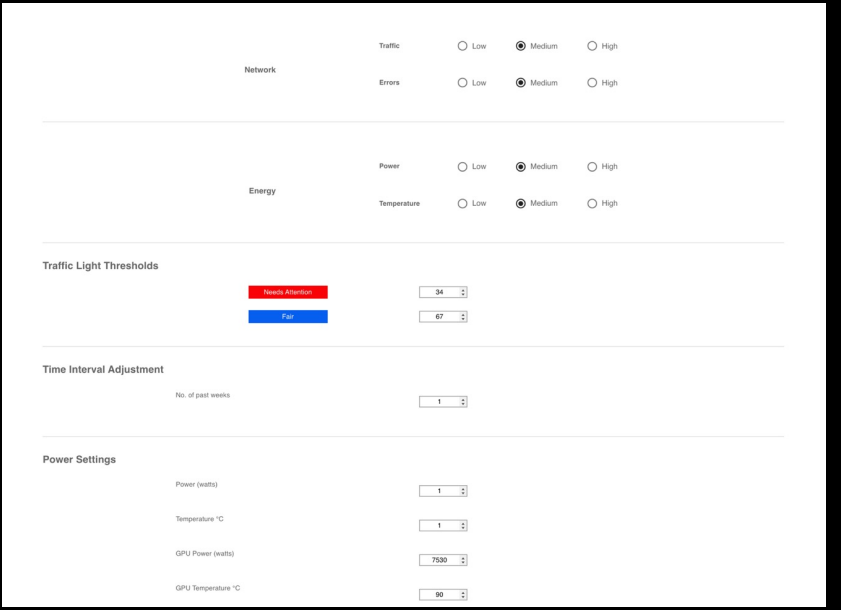
Feedback:
- Existing resource not sufficiently utilized.

Value to customer: Optimize HW resource utilization

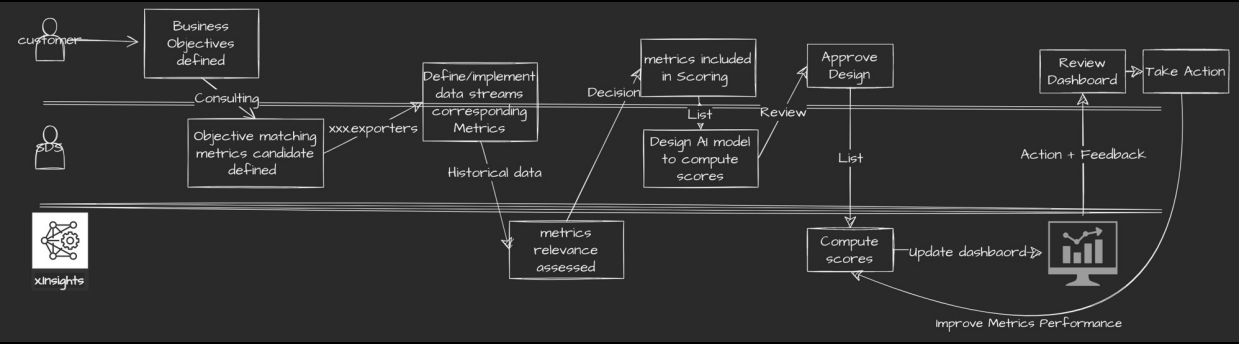
Customization

The end user can customize the system in these ways

- Boundaries of red-yellow and yellow-green areas in the traffic light.
- Levels of the bathtub curve (β, κ, λ) that specify the weights of each component score in the higher-level score.
- Forecasting time Intervals
- Power Settings



User On Boarding Process



* For exporters, CPU and memory load is <1%. the network load is dependent on the size of the data exported and the available bandwidth. Compaction and rollups at the source can be implemented if load is higher.

Future Plan

Accuracy

Add ML to increase accuracy comparing prediction to Actuals and increase breadth of metrics

Visualization

Create Widgets for different platforms to customize to look and feel and data endpoints for reporting

Market Research

Explore Operations and Cost models besides predicting capacity


Cost Management


Extensible


Proactive


Planning

Abstract

- x.Insights collects usage and process data from around the data center, aggregate and analyze it into a **series of health scores**, summarized into an **overall score**.
- x.Insights computes a **forecast** for each score so that users can see what will happen in the near future.
- x.Insights outputs a **purchase recommendation** for equipment.

Thank you