Outline

- Discuss Key performance indicators (KPIs).
- Explain the main differences between Multidimensional and Tabular OLAP.
- Key Performance

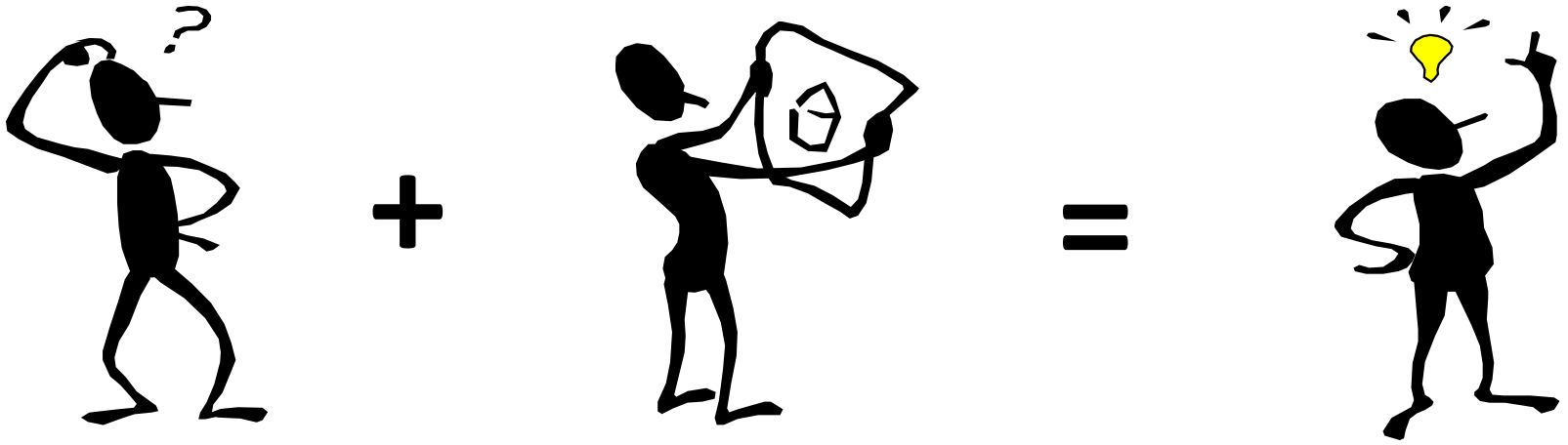
What is KPI

- Definition of 'Key Performance Indicators - KPI‘

A set of quantifiable measures that a company or industry uses to gauge or compare performance in terms of meeting their strategic and operational goals. KPIs vary between companies and industries, depending on their priorities or performance criteria. Also referred to as "key success indicators (KSI)".

Objectives of KPI

- Improve personnel's understanding of KPIs.



- Improve personnel's awareness of maintenance performance.

- KPIs are directly linked to the overall goals of the company.

- KPIs are measurements that define and track specific business goals and objectives.

- The larger or smaller organizational strategies require monitoring, improvement, and evaluation.

- Once an organization has analyzed its mission, identified all its stakeholders, and defined its goals, it needs a way to measure progress toward those goals.

- KPIs are utilized to track or measure actual performance against key success factors.

- Key Success Factors (KSFs) only change if there is a fundamental shift in business objectives.

- Key Performance Indicators (KPIs) change as objectives are met, or management focus shifts.

Why Use KPI’s

- Performance effectiveness.
- For the accuracy, actual reflection of the process, efficacy in delivering the outcome.
- The effects of a change can be monitored reliably, repeatedly and accurately by KPI.

- A KPI can be used to closely monitor the results of actions.
- Detect potential problems and it can drive improvement.
- It is reasonable to use the KPI as a tool to improve ongoing process performance.

Uses of KPI

- A **key performance indicator** (**KPI**) or **performance indicator** is used to measure the performance.

- To make the decision making process easier.

- **Key Performance Indicators (KPIs)** help organizations to understand how well they are performing in relation to their strategic goals and objectives.

- They are used by an organization to evaluate its success or the success of a particular activity in the organization.

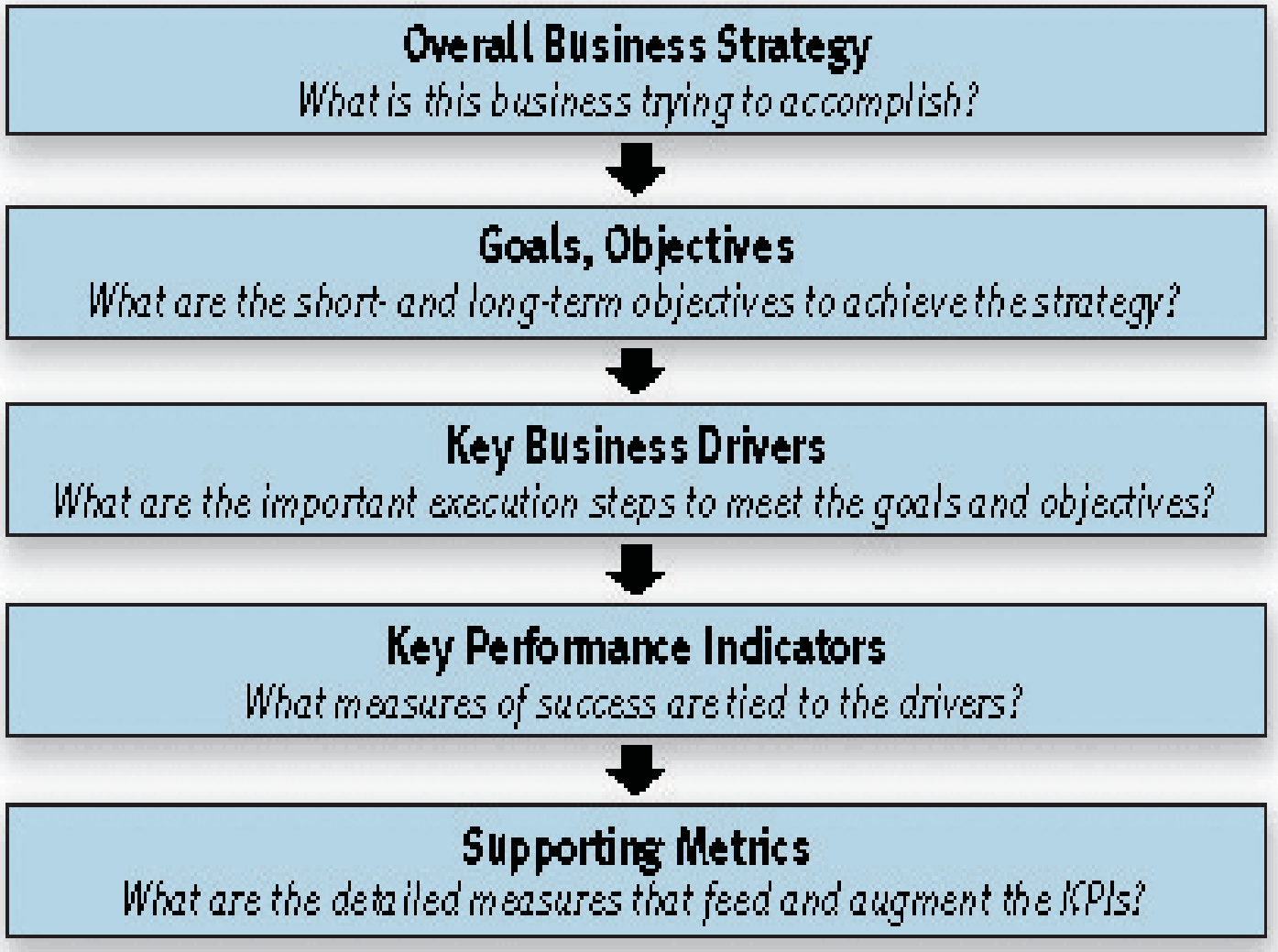
- To analyze the operational details of the organization.

- It helps to focus on the facts clearly.

- Key performance indicators are used periodically assess the performances of organizations, business units, and their division, departments and employees.

How to design KPI’s

- KPIs should be clearly linked to the strategy, i.e. the things that matter the most.
- KPIs have to provide the answers to our most important questions.
- KPIs should be primarily designed to empower employees and provide them with the relevant information to learn.


Overall Business Strategy
What is this business trying to accomplish?
Goals, Objectives
What are the short- and long-term objectives to achieve the strategy?
Key Business Drivers
What are the important execution steps to meet the goals and objectives?
Key Performance Indicators
What measures of success are tied to the drivers?
Supporting Metrics
What are the detailed measures that feed and augment the KPIs?

Identifying the KPI’s

- Related to strategic aims.
- Identify what makes the organization success or failures.
- Controllable and accountable.
- Qualitative and quantitative.
- Long term and short term.

- Consider Stakeholder needs.
- Identify important aspects.
- Establish Company Goals and KPIs.
- Select Performance Indicators and Metrics.
- Set Targets and Track Performance.

How Are KPIs Evaluated

- A KPI's status and score are determined by comparing its actual value against the thresholds that you define.

- The performance status of a KPI is represented by the status icon that you assign to each range.

Advantages

- Identifies everything that is easy to measure and count.
- Visibility on performance and strategic goal
- Agility in decision making
- Efficient management
- A team work on the basis of shared and measurable objectives.
- KPI’s do not give answers, rather they raise questions and direct once attention.

- It helps to measure both the financial and operational goals of a company.
- Improve operations.
- Increase project flexibility.
- Better job costing processes.
- KPIs focus employees' attention on the tasks and processes.

Disadvantages

- The KPI’s is intended to simply improve future results without reference to external parties and benchmarks.
- In that case one must develop KPI’s which use existing data available to the organization.
- Frequency of Data Collection.
- Should be measured frequently.
- No connection with the external database.

- Short – term.
- Backward looking.
- Used to punish rather than to motivate and equip.
- Too many measurements.
- Limits are to be set by the company itself.

Types of KPI

- **Process KPIs -** measure the efficiency or productivity of a business process.
- Examples - Days to deliver an order.

- **Input KPIs -** measure assets and resources invested in or used to generate business results.
- Examples - Dollars spent on research and development, Funding for employee training, Quality of raw materials.

- **Output KPIs -** measure the financial and nonfinancial results of business activities.
- Examples - Revenues, Number of new customers acquired.

- **Leading KPI** measure activities that have a significant effect on future performance.
- Drive the performance of the outcome measure, being predictor of success or failure.

- **Lagging KPI** is a type of indicator that reflect the success or failure after an event has been consumed.
- Such as most financial KPIs, measure the output of past activity.

- **Outcome KPI -** Reflects overall results or impact of the business activity in terms of generated benefits, as a quantification of performance.
- Examples are customer retention, brand awareness.

- **Qualitative KPI -** A descriptive characteristic, an opinion, a property or a trait.
- Examples are employee satisfaction through surveys which gives a qualitative report.

- **Quantitative KPI -** A measurable characteristic, resulted by counting, adding, or averaging numbers. Quantitative data is most common in measurement and therefore forms the backbone of most KPIs.
- Examples are Units per man-hour.

Characteristics of a good KPI

- KPI is always connected with the corporate goals.
- A KPI are decided by the management.
- They are the leading indicators of performance desired by the organization.
- Easy to understand

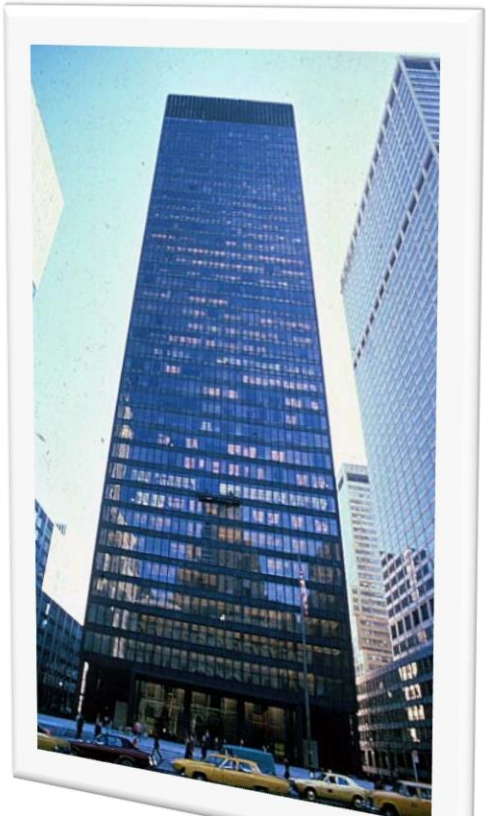
A KPI need to be:

- **S**pecific
- **M**easurable
- **A**chievable
- **R**esult-oriented or Relevant
- **T**ime-bound

Infrastructure sector

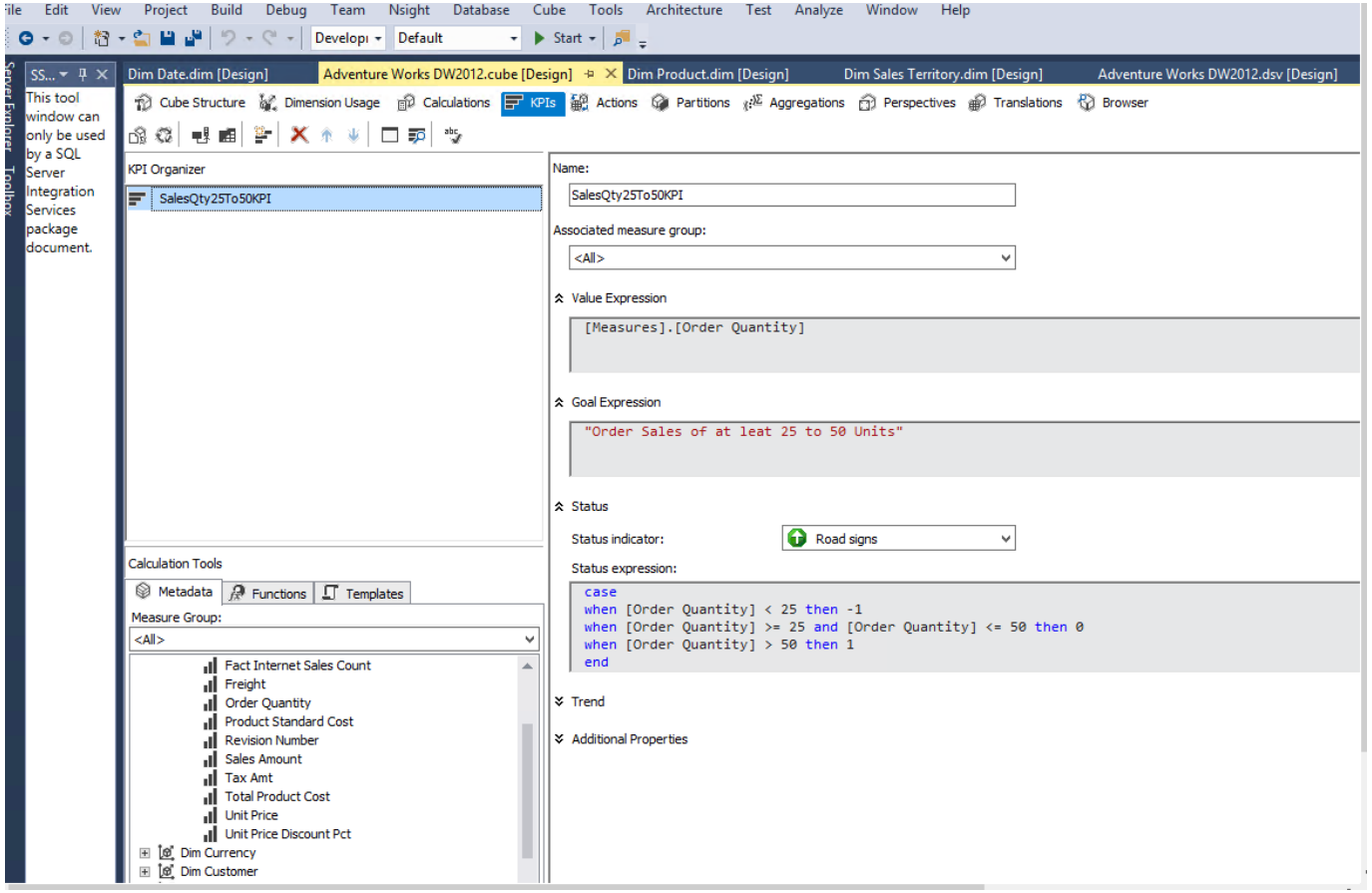
The main five KPI’s in Infrastructure sector are:

- Client Satisfaction.
- Construction Time & Cost.
- Productivity.
- Defects.
- Profitability.

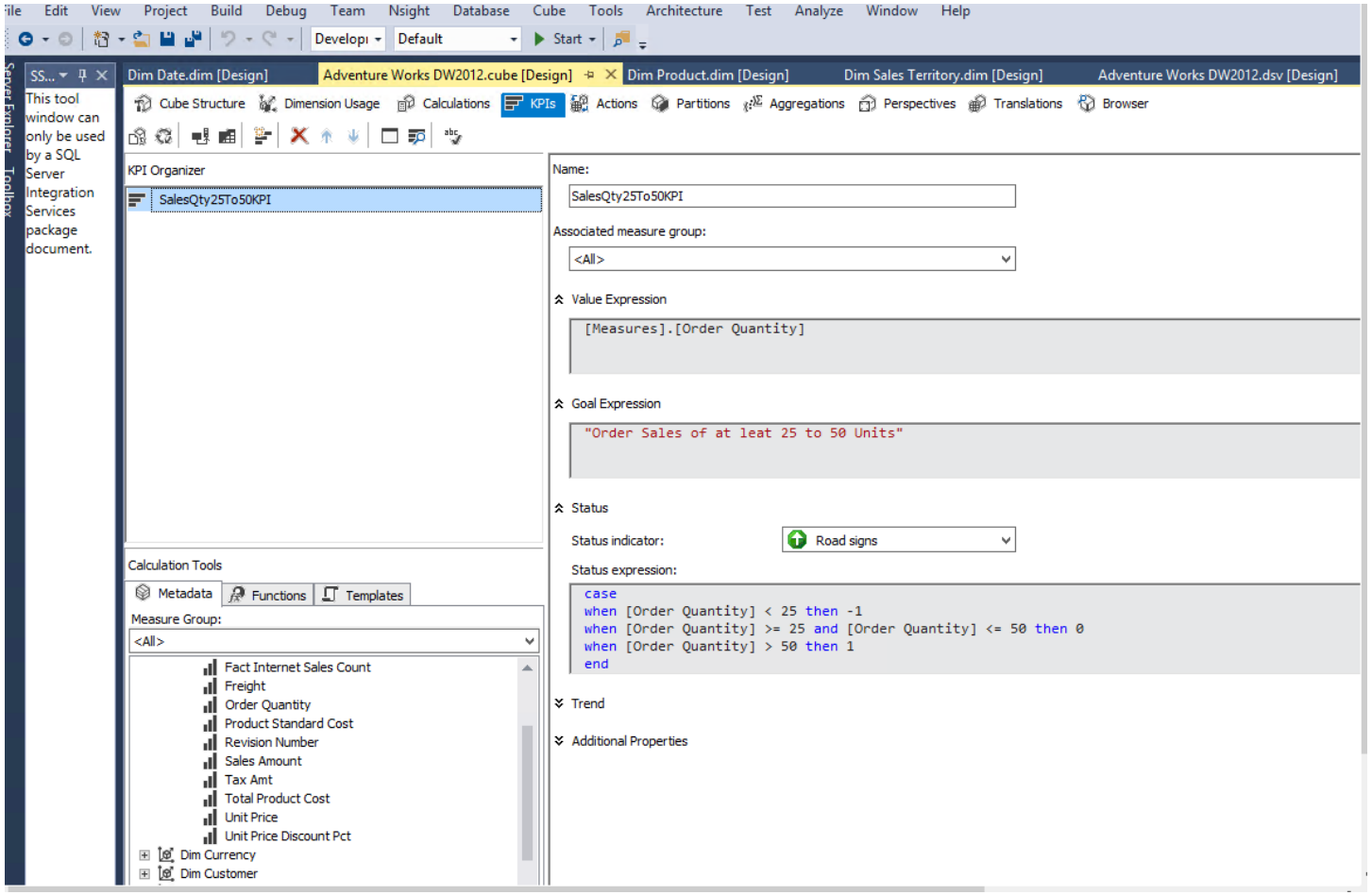


Adding KPIs in SSAS

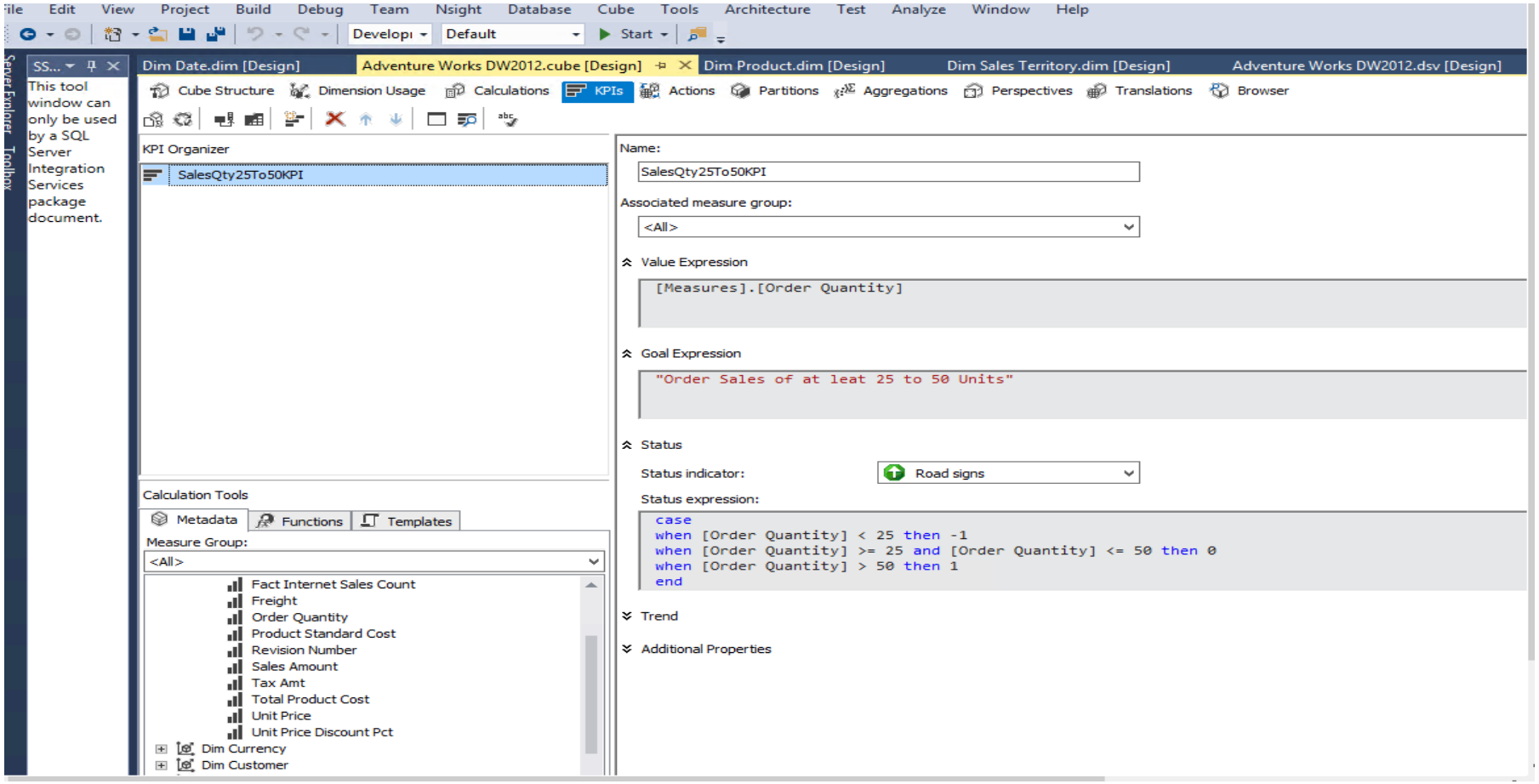
- Click on the highlighted KPI icon



Name the KPI, identify the measure

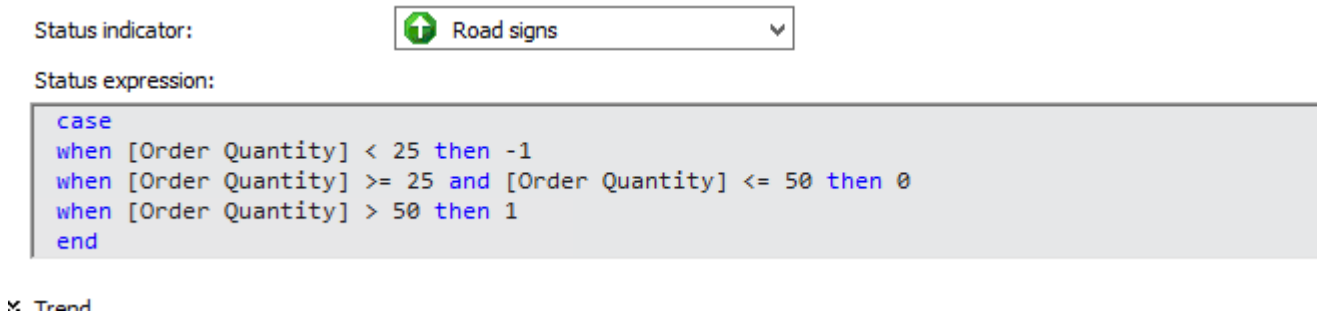


Identify the measure quantity



Select the status Indicator, supply the expression

- The states returned by the expression has to match those of the status indicator



Deploy process, browse cube

Sales Territory Region	Sales Territory Country	Sales Territory Group	Order Quantity	SalesQty25To50KPI Value	SalesQty25To50KPI Goal	SalesQty25To50KPI S
Australia	Australia	Pacific	13345	13345	Order Sales of at leat 2...	1
Canada	Canada	North America	7620	7620	Order Sales of at leat 2...	1
Central	United States	North America	21344	21344	Order Sales of at leat 2...	1
France	France	Europe	5558	5558	Order Sales of at leat 2...	1
Germany	Germany	Europe	5625	5625	Order Sales of at leat 2...	1
NA	NA	NA	(null)	(null)	Order Sales of at leat 2...	-1
United Kingdom	United Kingdom	Europe	6906	6906	Order Sales of at leat 2...	1

First Tabular model

- Free add-in for Excel 2010
- Power Pivot for SharePoint
- DAX Language v1.0
- Import Mode Only
- On-Premise Only

SQL Server 2012-14

- Excel Data Model 2013
- PowerPivot for SharePoint 2013

- BI Semantic Model
  - Partitions, Role Security
- DAX Language v2
- Limited Direct Query Mode
- On-Premise Only

SSAS Tabular 1200

- Power BI Desktop, Excel 2016
- PowerPivot for SharePoint 2016

- Enhanced Modeling and Scale
- Power BI Desktop & Service
- Super DAX & Variables
- Enhanced Direct Query
- SSAS Azure Preview

SSAS Tabular 2016 Architecture

- Formula and Storage Engine work together to resolve queries from client reporting tools

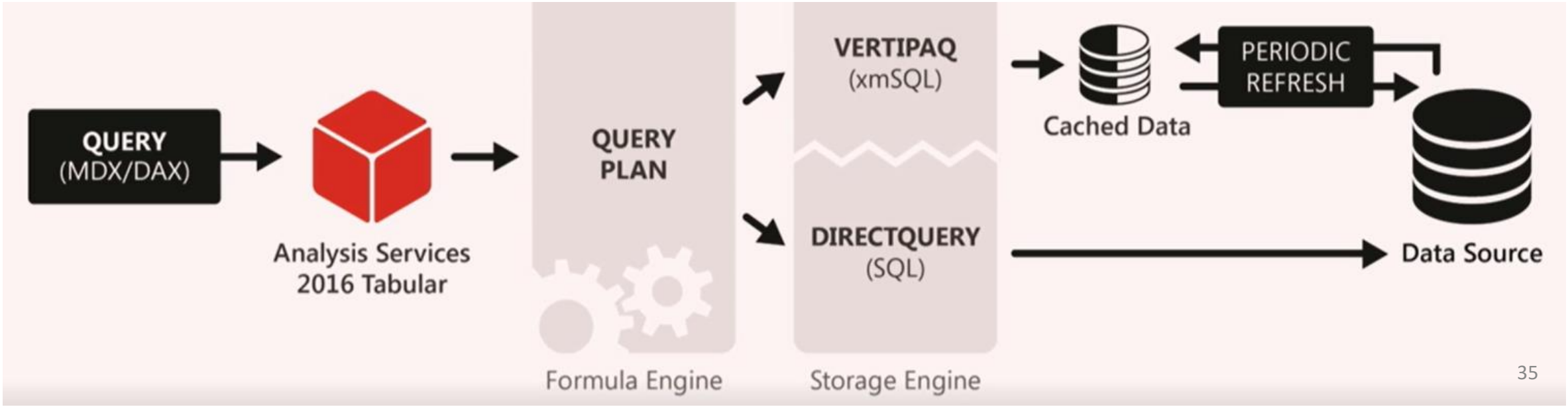
Formula Engine
- "The Brains"
- Produce Query Plans
- Requests data from SE
- Evaluates Complex Logic
- Only Single-Threaded

Request

Data Caches

Storage Engine
- "The Muscle"
- Return data caches to FE
  - Query Results Cache
  - Simple queries only
- Multi-Threaded

- Vertipaq Mode (Default) stores data in a compressed, columnar format upon processing from source
- Different query plans and performance depending on client tool (MDX or DAX); Power BI is optimal
- Prior DirectQuery version was very limited: DAX clients only, SQL Server only, poor performance
- Query performance is generally improved via greater utilization and compression of storage engine



SSAS Tabular Architecture

- Formula and Storage Engine
- work together to resolve queries from client reporting tools

Reasons to Adopt Tabular 2016

- Prior Reasons Still Valid:
  - Rapid, agile modeling
  - In-Memory, Columnar Performance
  - Align with MSBI Roadmap (Power BI)
  - Easier to learn language (DAX vs MDX)
  - Migrate Self-Service Models to Server
- Scalability
  - NUMA Scheduler in SP1
  - Parallel Partition Processing
  - Improved DAX Query Engine
- Support for Complex Models
  - Bi-Directional cross-filtering (M2M+)
  - Tabular Model Explorer, Display Folders
- Viable Direct Query Option
- New DAX Functions (50+) and Variables
- Translations
- Cloud Deployment Option
- Manageability: Object Model and TMSL

Reasons to not adopt Tabular 2012-14

- Experienced MDX/MOLAP BI professionals

- Complex Models
  - Multi-Column Relationships
  - Scoped Assignments, Unary Operator
  - Parent-Child Hierarchies

- Out-of-the Box Features
  - Report Actions
  - Drill through Behavior

Formula Engine

- Produce Query Plans
- Requests data from SE (Storage Engine)
- Evaluates Complex Logic
- Only Single-Threaded

- Different query plans and performance depending on client tool (MDX or DAX); Power BI is optimal

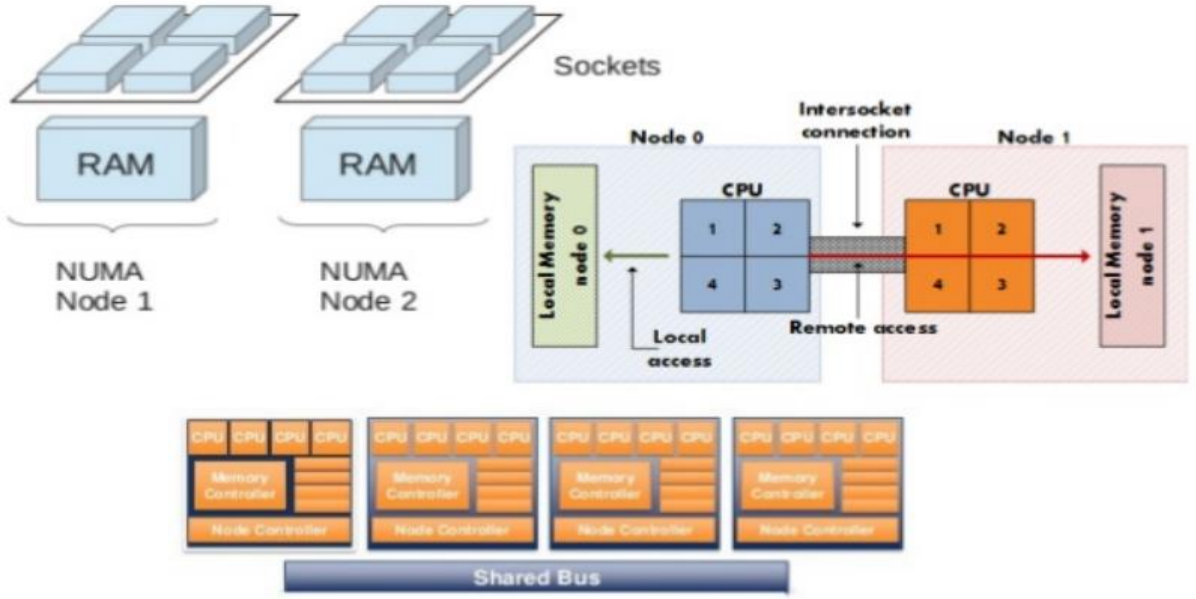
Storage Engine

- Return data caches to FE (Formula Engine)
- Query Results Cache
- Simple queries only
- Multi-Threaded

- Vertipaq Mode (Default) stores data in a compressed, columnar format upon processing from source

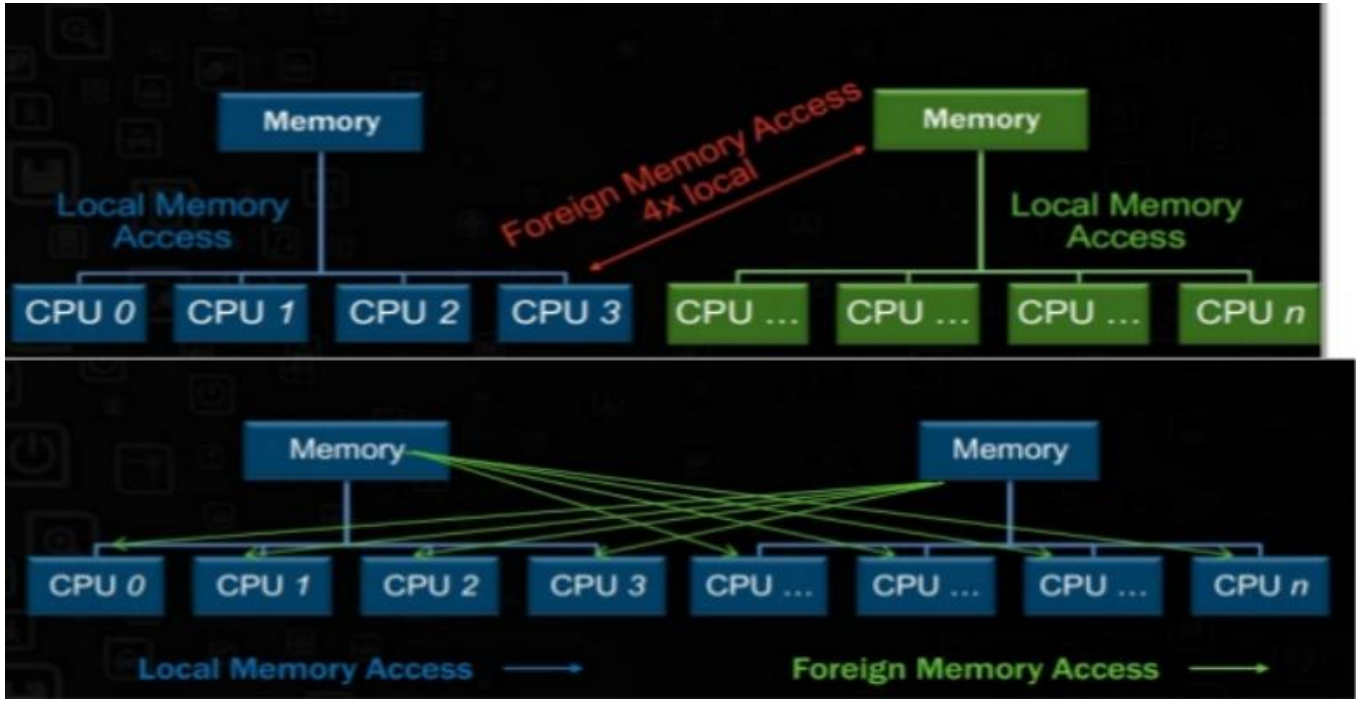
What is NUMA?

- Groups of processors (NUMA node) have their own local memory
  - Any processor can access any memory, including the one not "owned" by its group (remote memory)
  - Non-uniform: accessing local memory is faster than accessing remote memory



What is NUMA?

- Nodes are linked to each other by a hight-speed interconnection
- NUMA limits the number of CPUs
- Each group of processors has its own memory and possibly its I/O channels
- The number of CPUs withing a NUMA node depends on the hardware vendor.



What is NUMA?

- Facts:
  - (most of) memory is allocated at task startup.
  - tasks are (usually) free to run on any processor.

  Both local and remote accesses can happen during task's life.