Analytics Applications

Lessons learned

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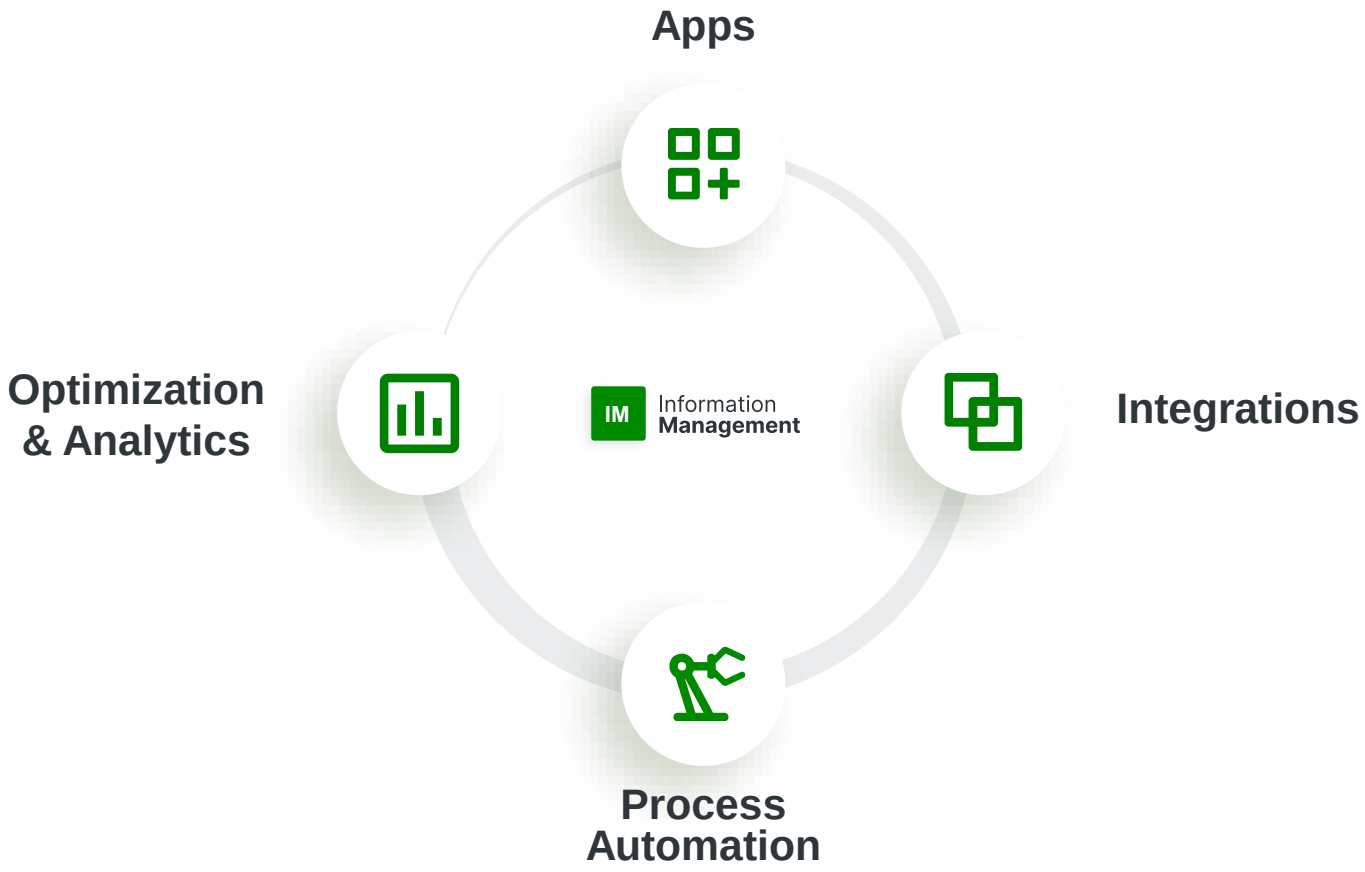
Our journey

What we do

Helping our customers on their digital journey



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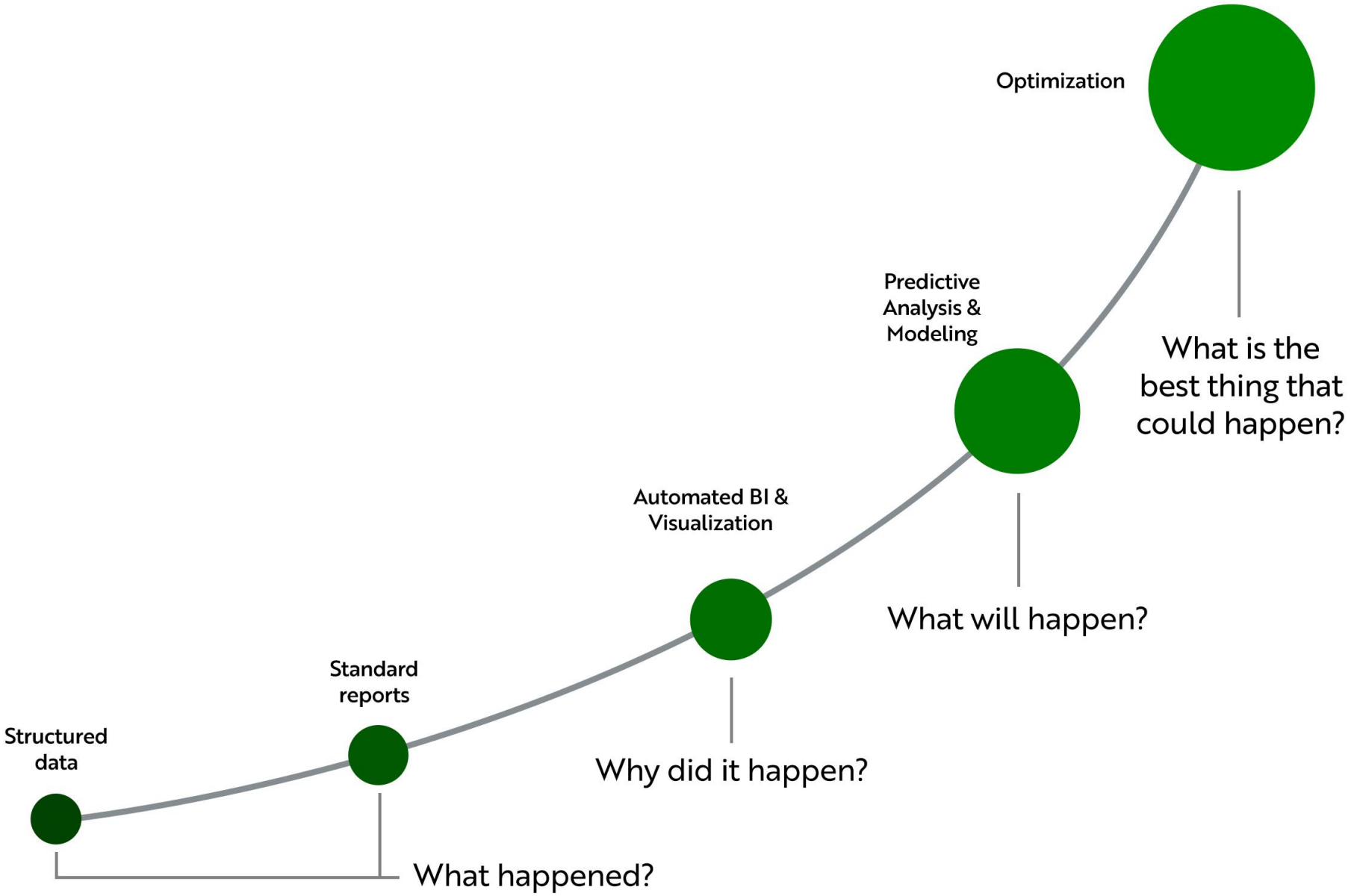
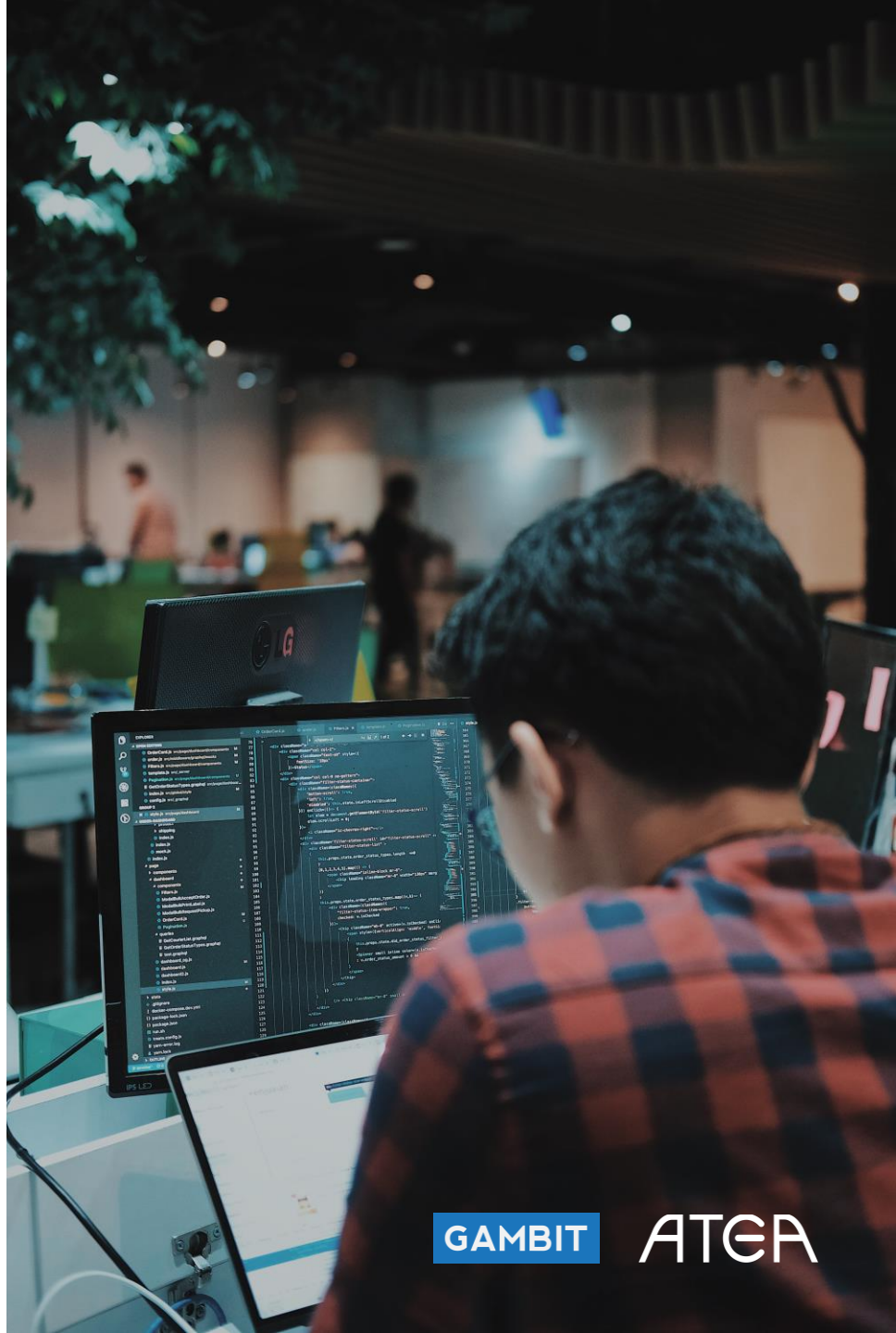

Optimization
Predictive Analysis & Modeling
Automated BI & Visualization
Standard reports
Structured data
What is the best thing that could happen?
What will happen?
Why did it happen?
What happened?

How can developers support analytics with good practices?

- How is this related to what I do?
- How can I develop my way-of-working?



Case: Modelling relationships

- Data: 10 years of hourly samples of process input, states and output.

- ”Does the temperature during the production process have any impact on the output concentration?”

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Case: Identifying related data in different parts of enterprise

- IoT devices stream data to the cloud
- Can the data context be found for these devices in other systems?

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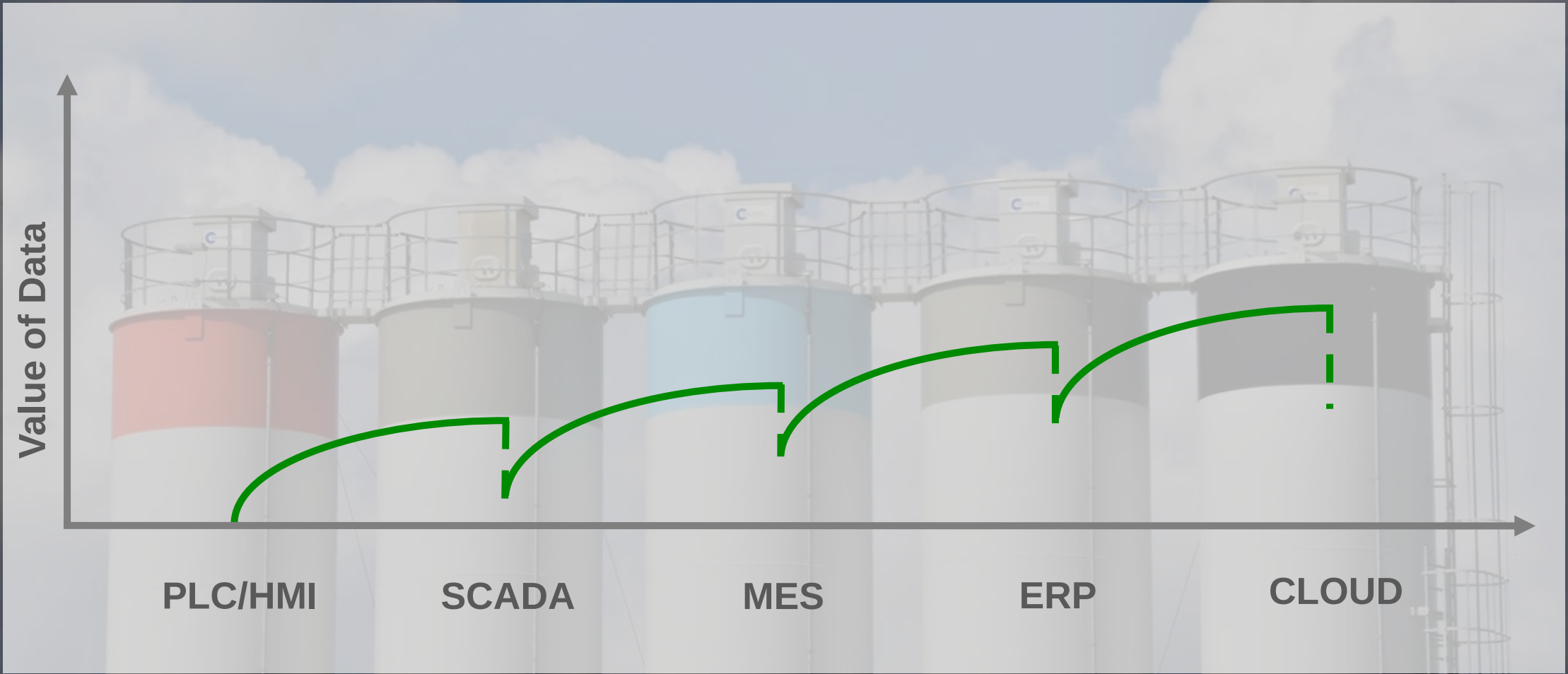
Value of enterprise data with context loss



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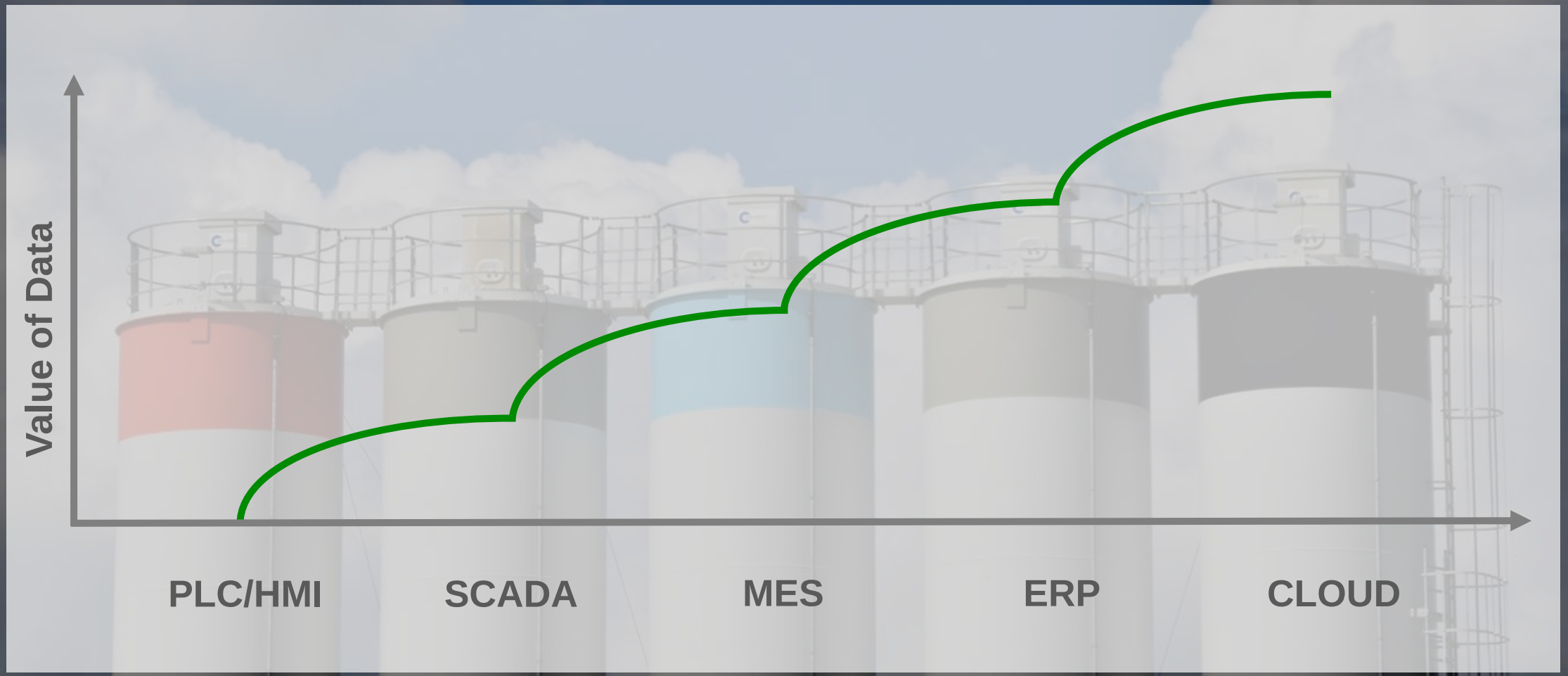
Value of data with no context loss



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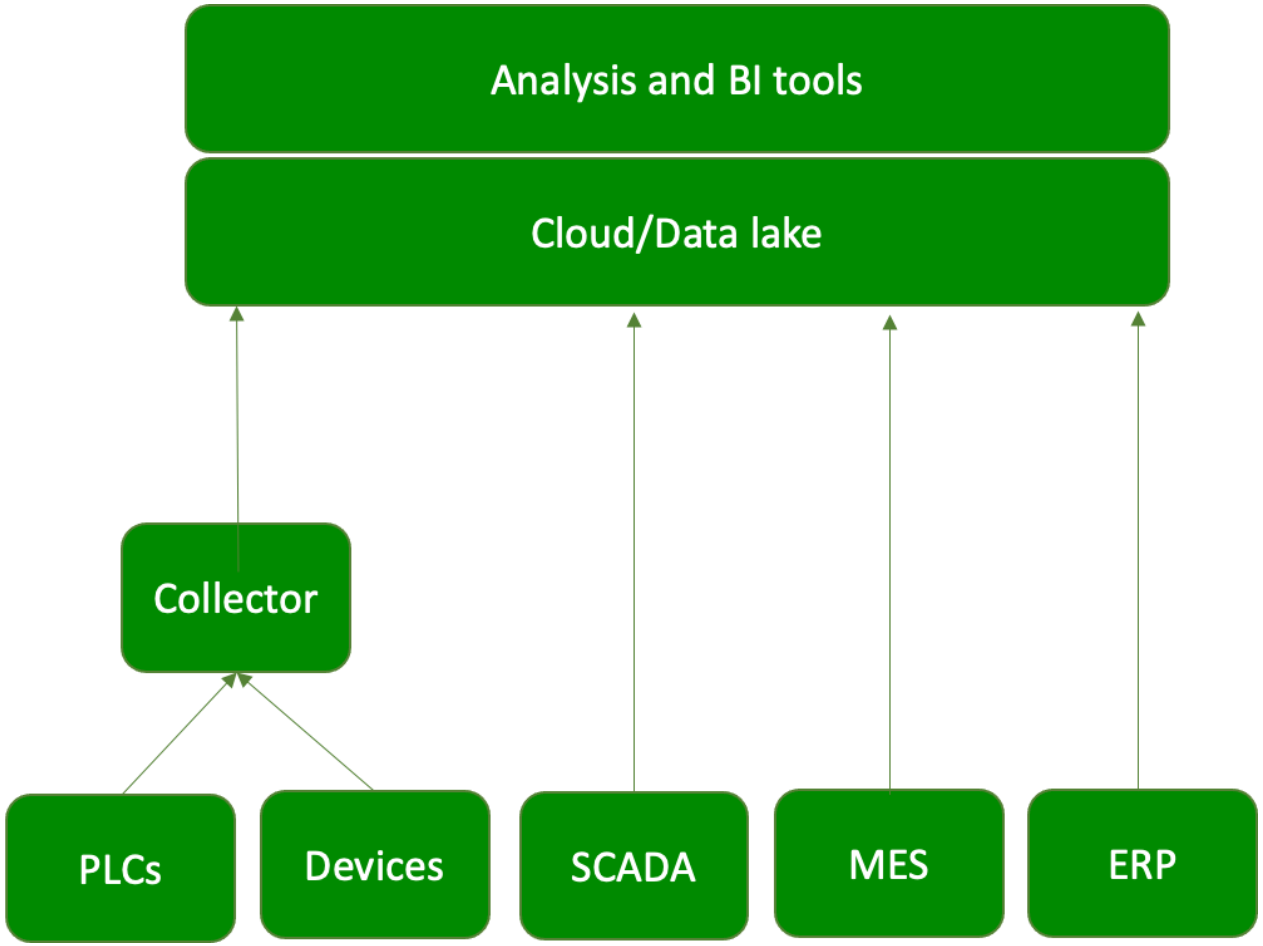
Solution driven approach

Streaming raw data directly into the cloud with no or little context

Problems:

- No abstraction
- No normalization
- Data gaps
- Same data silos

Only selected cases are solved



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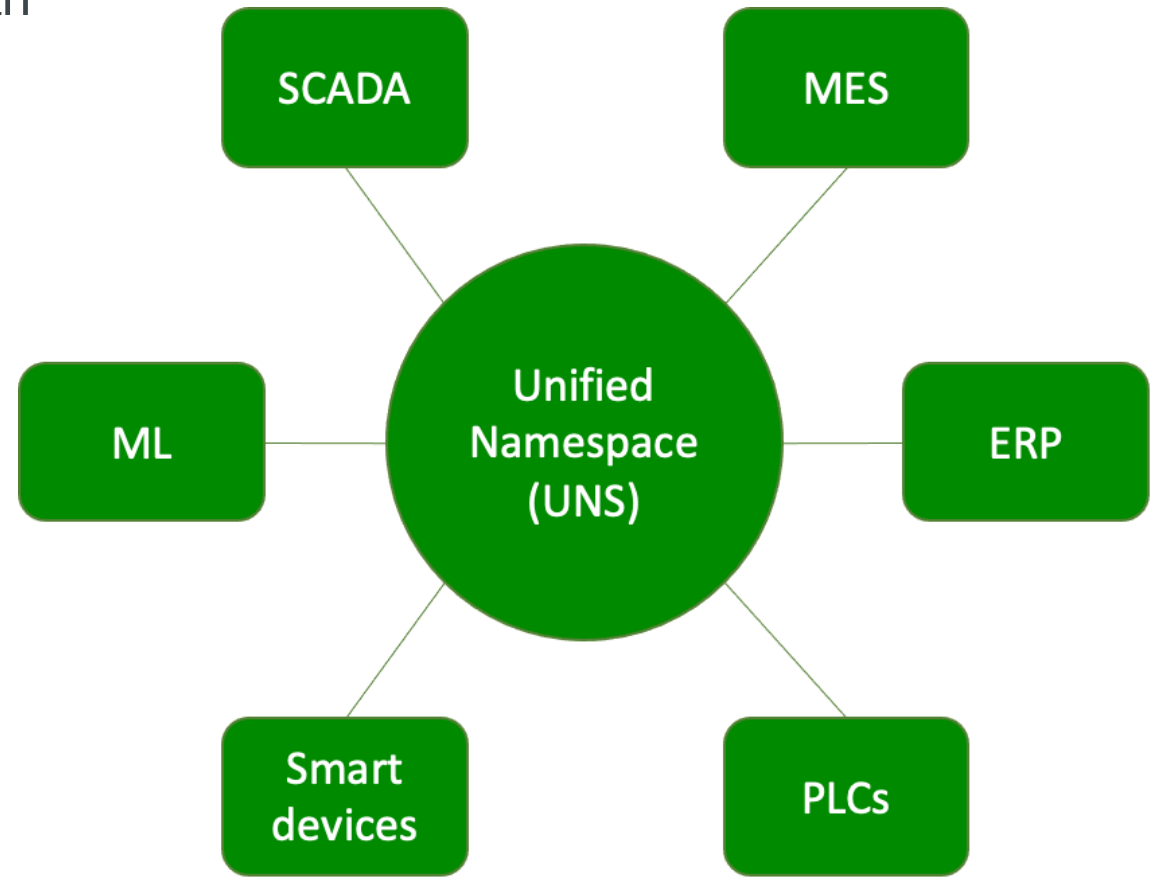
Technology driven approach

Nodes takes part in an eco-system and can both **produce** and **consume** data

Requirements:

- Report by exception
- Lightweight
- Open architecture

Current state of business



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- Corporation
  - Site 1
    - Line 1
      - Cell 1
        - PLC
          - Temperature
          - EnergyConsumption
        - MES
          - OEE
          - ProductType
          - Parameters
        - ERP
          - OrderNumber
        - AI
          - Suggestions
            - NextMaintenance
      - Cell 2
        - ...
    - Line 2
      - Cell 1
        - ...
  - Site 2
    - ...

```
{
  "energyMeter": {
    "timestamp": 1662633420,
    "value": 1337,
    "unit:" "kWh"
  }
}
```

Topic examples:

PartsUnlimited/Site1/Line1/Cell1/EnergyConsumtion

PartsUnlimited/Site1/Summary/OEE

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Case: Data aggregation

- Client developed a Master Data Management (MDM) system
- What is MDM?
  - Master data for all things, persons or places that are relevant for different parts of business.
  - Important data – not all data!
- Why MDM?
  - ensure that organization's shared data is consistent and accurate

https://www.informatica.com/resources/articles/what-is-master-data-management.html
https://www.tibco.com/reference-center/what-is-master-data-management

Case: Data aggregation

- Business: B2C distribution
  - Big Orderdata for large amount of clients over long time

- What to keep in MDM?

- What information is lost?

Case: Non-consistent data

- Client had user user interface for storing numeric project data. Data treated as strings both in interface and database.
- Result:
  - 16,5 and 16.5 both ok
  - Empty values are represented by null, ” ” (1 space), ”-” (minus), ”” (empty string)
  - Unknown values are represented by ”???”, ”?”, ”16?” etc
  - On limits
    - numbers mixed with: ”<=4”, ”>6”
    - In some cases, ”X” or ”x” for ”yes, these is a limit”
  - Ranges indicated by ”0-400”, ”400-x”, combinations like ”A > 2, B < 4” and ”600-x €/month”

text
0-100
0-x00
0-99999999
0-10000
5-50
0-40
?
?
0-160

x
1.5
4,5
5
1.5
55

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Case: Non-consistent data

- Locally, this mix of numbers, text and operators can possibly be understood
  - The data is in many cases useless, or even harmful if used outside the specific function
- This happens because the user is allowed to input it
- ”Users gonna use”

text
0-100
0-x00
0-99999999
0-10000
5-50
0-40
?
?
0-160

x
1.5
4,5
5
1.5
55

User gonna use – part 2

- Users input production plans into system

- Users have different naming conventions resulting in difficulty in analyzing the data
  - Is a production run for one or two batches?
  - Different usage of labeling of production lines across users.

Summary

- The value of data is directly related to how well it can be used inside and across data silos in an organization
- Useless data is more costly than no data
- Developers can do a lot to improve the usability of data