CNC machines are most often durable, long lasting pieces of equipment that can be relied upon for their redundancy. But despite their reliability, programming complexity and other components contained in the CNC machine often lead to small, but frustrating problems. These issues are compounded by the fact that the most common CNC machining problems are caused by either user error or poor maintenance.

When it comes to common CNC machine problems, the roots causes can often be traced back to one of three issues:

I.   Improper Tools/Settings
II.   Improper Maintenance
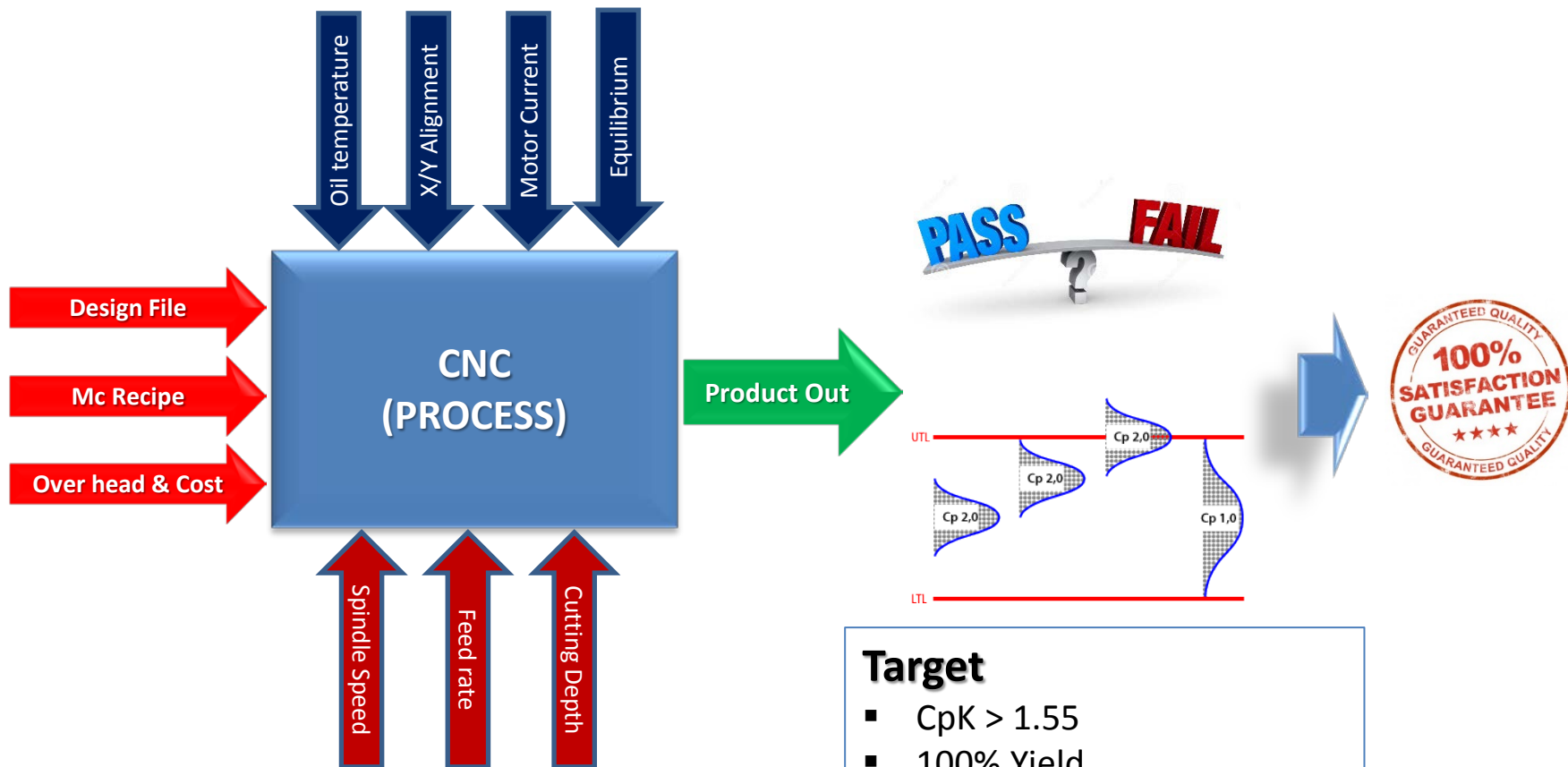III.   Improper Programming

We'll address problem statement above with industrial 4.0 solution, by considering 2 CNC machine below:

Legacy CNC (Hurco VM1)   New CNC (FX7 Linear)

PSDC

Inputs (top arrows)
- Oil temperature
- X/Y Alignment
- Motor Current
- Equilibrium

Inputs (left arrows)
- Design File
- Mc Recipe
- Over head & Cost

CNC (PROCESS)

Inputs (bottom arrows)
- Spindle Speed
- Feed rate
- Cutting Depth

Product Out

PASS FAIL ?

100% SATISFACTION GUARANTEE
GUARANTEED QUALITY ★★★★ GUARANTEED QUALITY

UTL

Cp 2,0
Cp 2,0
Cp 2,0
Cp 1,0

LTL

Target
- CpK > 1.55
- 100% Yield
- Availability > 95%
- Performance Rate > 95%
- Opex cost reduction of 30%

Sophic

To enable I4.0 capabilities in both old & new machines with the following capabilities;

Industrial Internet of Things

Horizontal and Vertical Integration
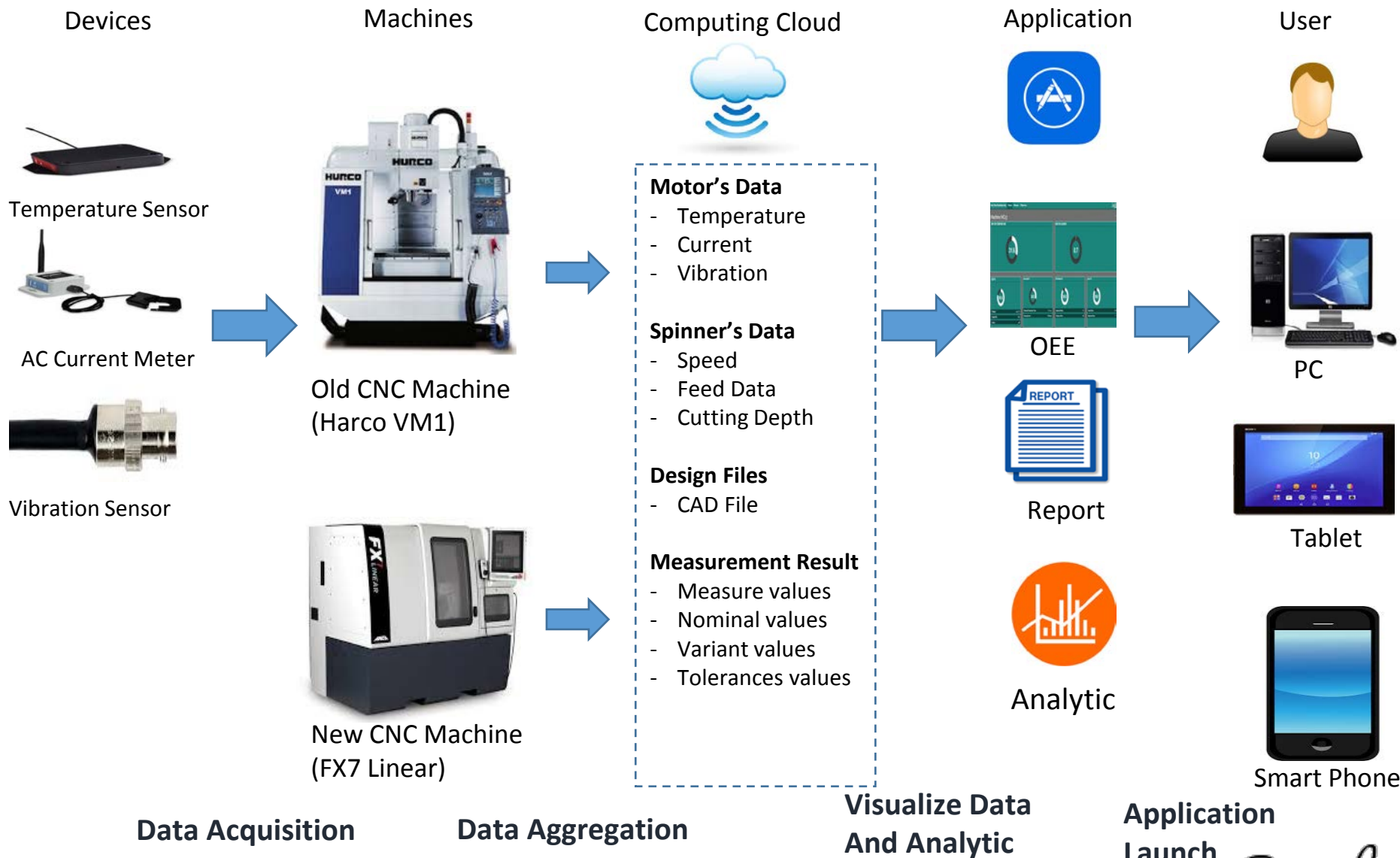
Simulation & Augmented Reality

Big Data Analytics

Cloud

1. Industrial IoT – Sensors (Vibration, Temperature, Current)
2. Horizontal & Vertical system integration
   - System integration of design to equipment to Product/Process validation (Process control & Customer Specification)
   - IoT of machine real-time remote monitoring on critical process & machine parameters
3. Augmented Reality – real time on machine critical control parameters
4. BIG Data analytics
5. Cloud computing

Devices

Machines

Computing Cloud

Application

User

Temperature Sensor

AC Current Meter

Vibration Sensor

Old CNC Machine
(Harco VM1)

New CNC Machine
(FX7 Linear)

Motor's Data
- Temperature
- Current
- Vibration

Spinner's Data
- Speed
- Feed Data
- Cutting Depth

Design Files
- CAD File

Measurement Result
- Measure values
- Nominal values
- Variant values
- Tolerances values

OEE

Report

Analytic

PC

Tablet

Smart Phone

Data Acquisition

Data Aggregation

**Visualize Data
And Analytic**

**Application
Launch**

Our IOT solutions enable the machines to use network resources to communicate with remote application infrastructure for the purposes of monitoring, control, and data analytics, it helps:

➢ Managing the files transfer - it Automates file transfers and ensure the files transfer securely and reliably from the computer to the machine.

➢ Providing predictive Maintenance –, efficiently perform root-cause analyses, reduce machine downtime due to the failure of critical parts by using real-time predictive analytics

➢ Ensuring quality Improvements – with the help of data analytics, connected machines can be modified to prevent future equipment failure.

➢ To give an actionable information- It helps improving performance at which all the process at the floor plant will be captured , made visible and present it on actionable information dashboard.