边缘计算 Edge Computing CONSORTIUM

智联5G 绽放边缘

2019边缘计算产业峰会
Edge Computing Industry Summit 2019

NATIONAL INSTRUMENTS

设备智联，拥抱NI的边缘智算

王林
National Instruments
华北区销售经理

OPERATIONS IN
50+ COUNTRIES

$1.36

BILLION
IN 2018

35,000+
CUSTOMERS WORLDWIDE

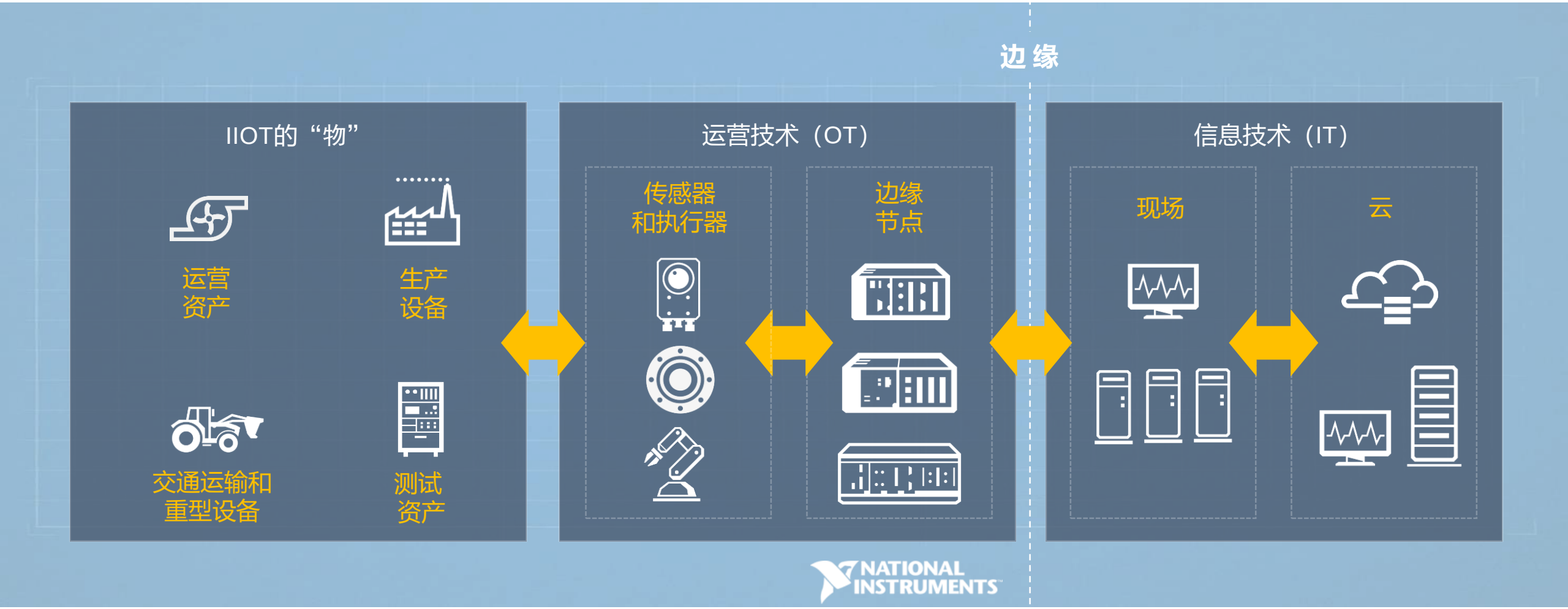
16%
INVESTMENT IN R&D

NATIONAL INSTRUMENTS™

Hardware and Software for Automated Test and Automated Measurement

Global Headquarters - Austin, TX

NI 模块化、开放式平台快速构建工业物联网



NI RIO架构的边缘计算平台

FPGA
实时计算与控制

适合苛刻工业环境
-40 °C至 70 °C
50 G 冲击

高性能实时处理器
(Linux-RT)

模块化的IO模块
通道间隔离

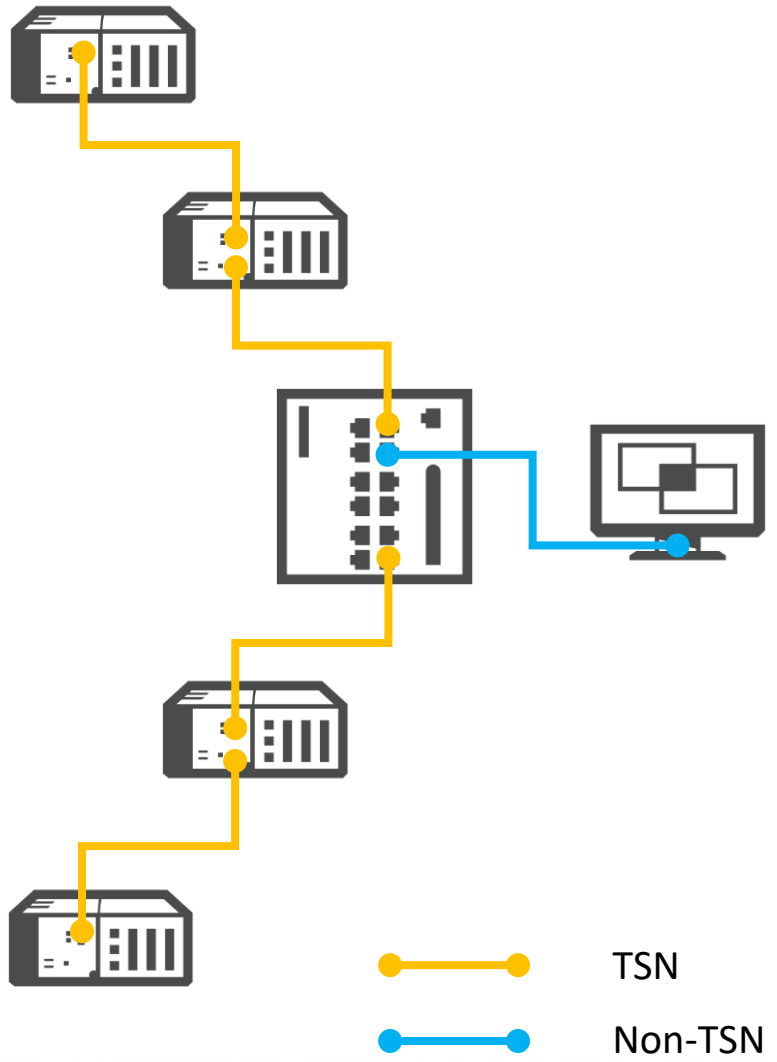
体积小，功耗低

支持所有传感器类型、模拟/数字信号输入输出和工业通信协议

- 加速度
- 速度
- 位移
- 转速
- 电压电流
- 过程量 (4-20 mA)
- RTD
- 热电偶
- 数字脉冲
- GPS
- Modbus，OPC/UA
- …等数十种

NI边缘硬件全面支持TSN高精度同步技术

- 802.1AS devices are automatically synchronized when connected
  - < 1uS synchronization
  - Can be much lower when optimized
- Sync unaffected by cable length
  - 802.1AS uses packets, not signals to synchronize
  - Ethernet/Fiber length specifications
- NI has tested up to 15 hops/line



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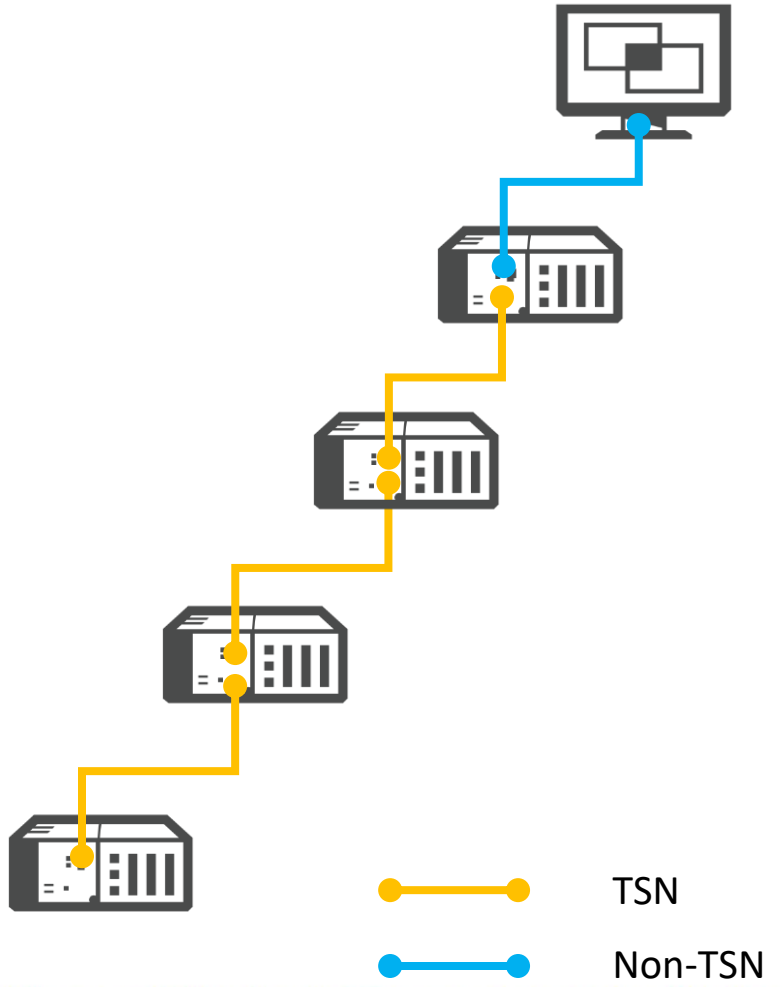
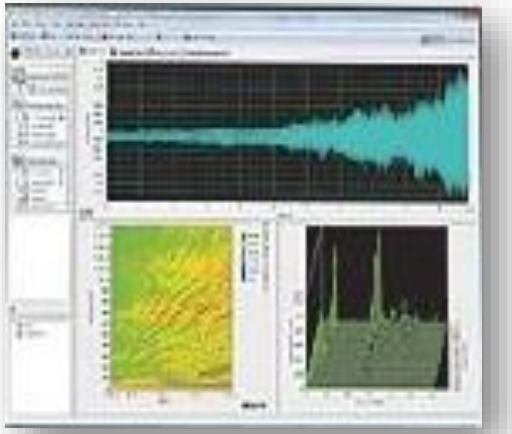
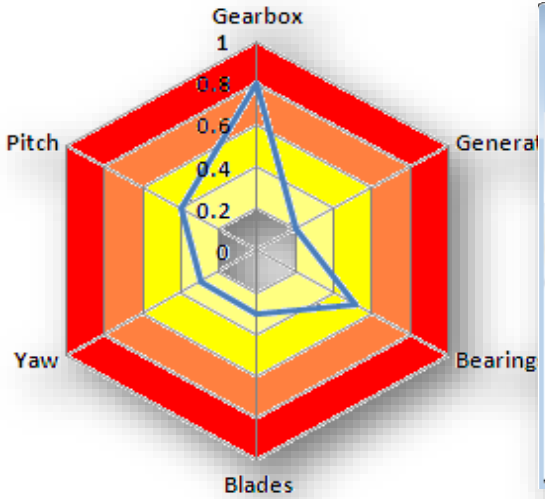


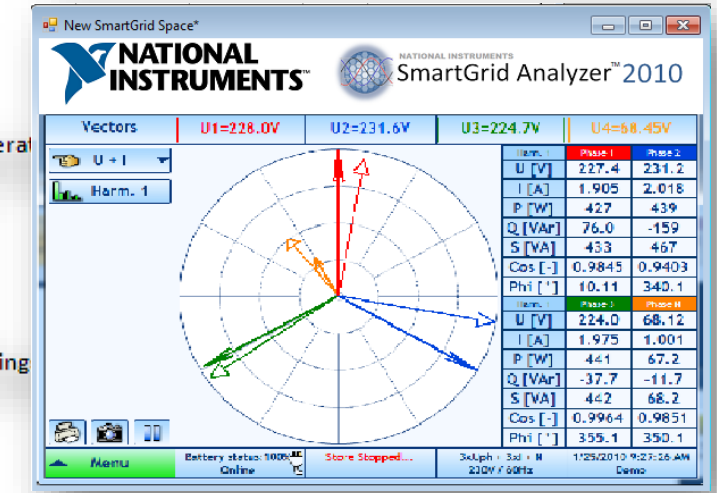
NI 边缘计算工具包

- LabVIEW与C/C++/C#/Python/Matlab工具链无缝衔接
- 高级信号处理工具包
  - 时频分析、时序分析和小波分析工具
- 声音和振动工具包
  - 音频测试、声学测量和振动测量
- 电力测量套件
  - 电压电流频谱谐波分析，电能质量分析
- 视觉开发模块
  - 数百个图像处理算法和机器视觉函数，以增强图像、检查对象是否存在、定位特征、识别对象、测量零件等等
- 机器学习工具包
  - 降维，聚类，异常检测，分类，支持传统机器学习模型部署在NI边缘设备

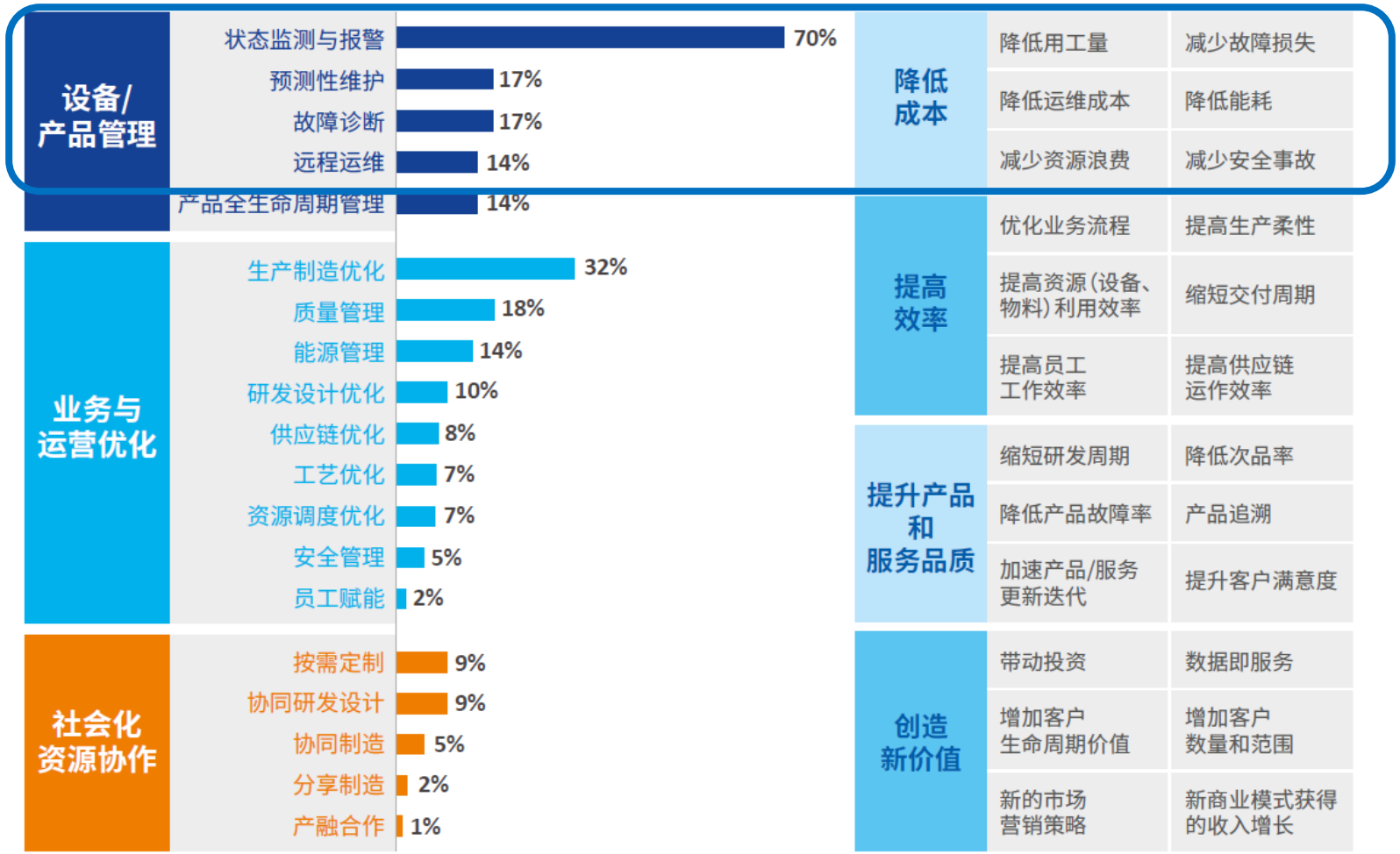


Graphic	Signal Characteristic	Analysis Methods	Machine Example
f t	Narrow frequency band lasting for a long time	Frequency Analysis Fourier Transform Power Spectrum	Unbalance in a single speed machine
	Narrow frequency band with harmonics lasting for a long time	Quefrency Cepstrum	Damaged bearing in a machine with roller element bearings
	Time varying frequency band	Time-frequency analysis Order analysis	Unbalance in a variable speed pump
	Wide frequency band signal lasting for a short time	Wavelet analysis AR Modeling	Low speed machine with compressor valve impacts
0	Narrow frequency band signal lasting for a short time	Wavelet Analysis	Electrical motor driven machine with rub and knock noise.





预测性维护是边缘计算在工业落地的最短路径



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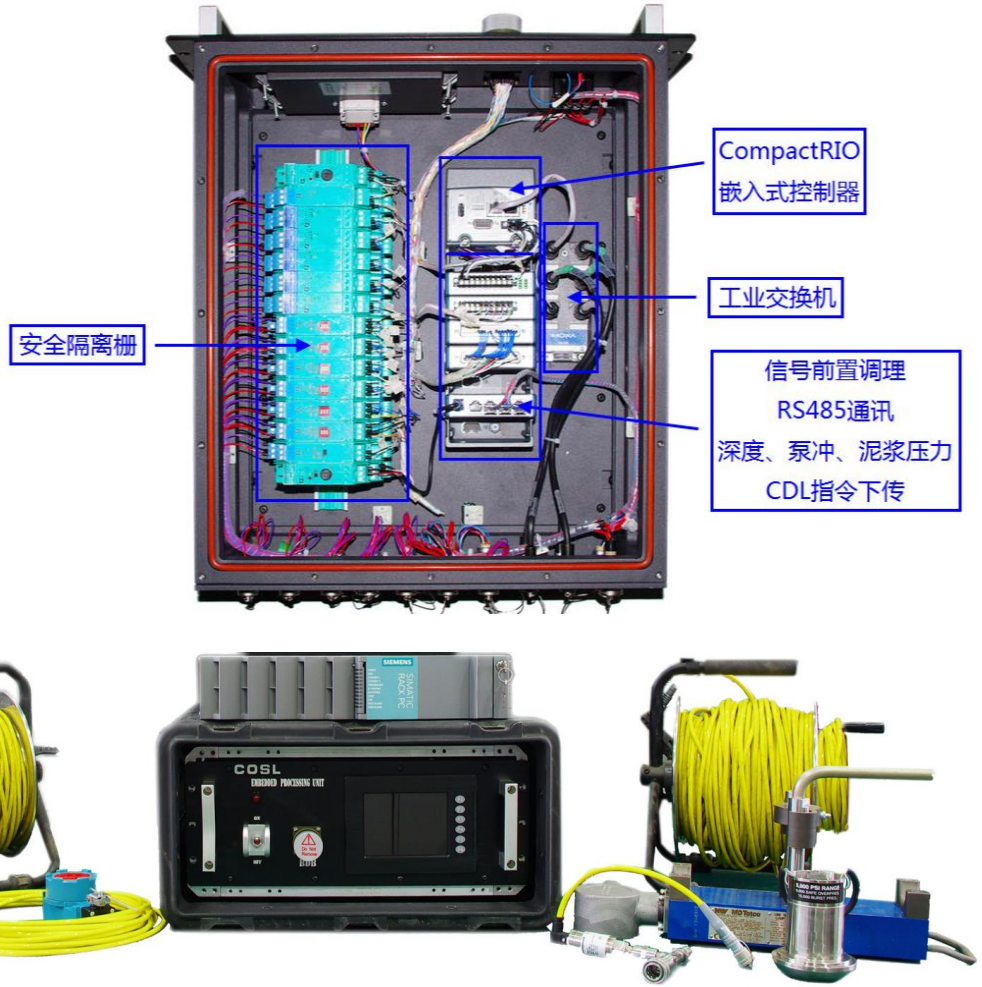
《2018工业互联网平台创新发展白皮书》
国家工业信息安全发展研究中心
两化融合服务联盟
中国产业与互联网发展联盟

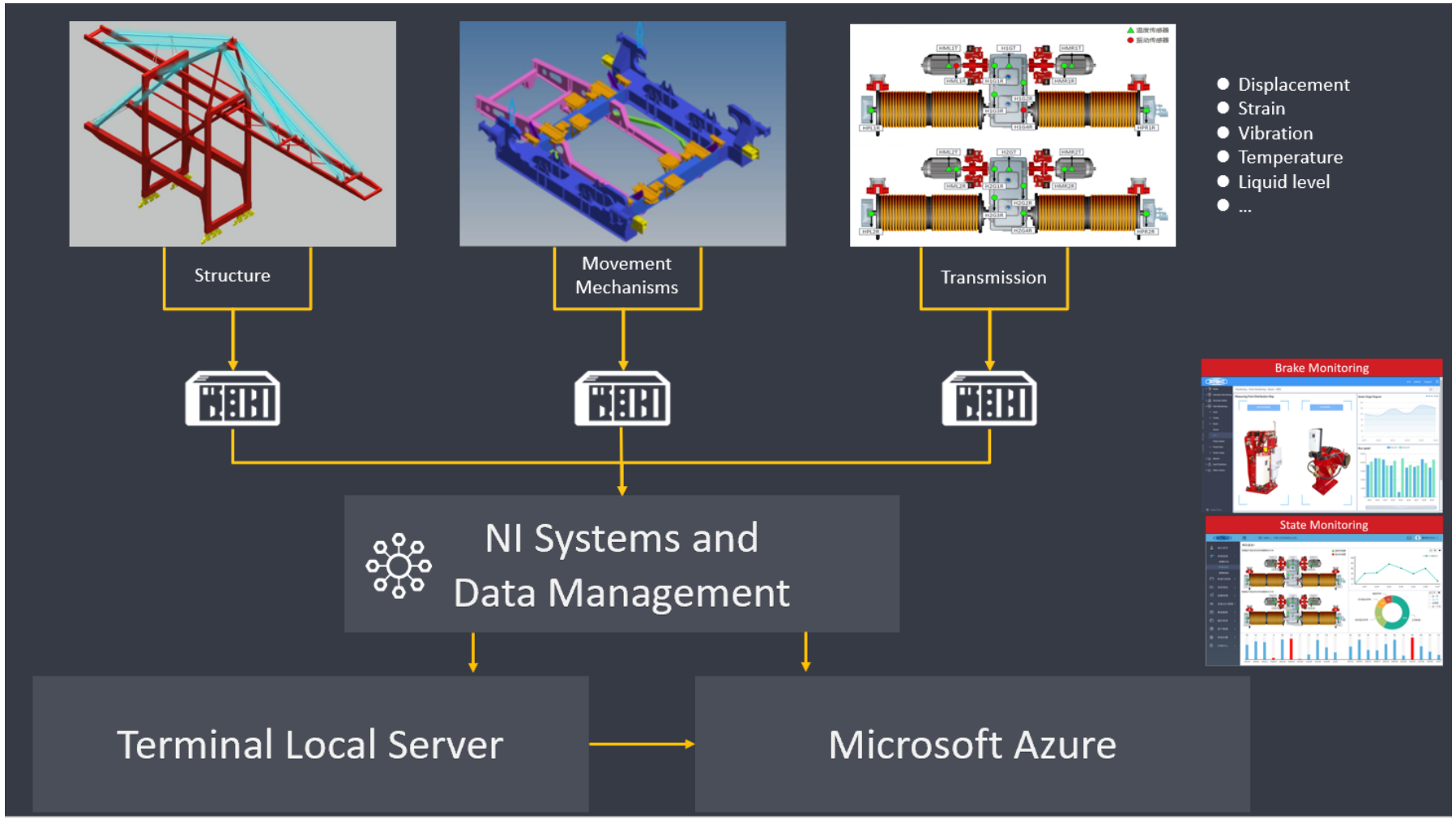
中海油服“贪吃蛇”随钻地面核心监测系统

- 泥浆脉冲遥传信号及钻进深度实时监测
  - 自研泥浆压力传感器、深度编码盘、死绳传感器、钩载传感器和泵冲传感器信号
  - 自研基于FPGA的环境干扰噪声滤除信号处理算法

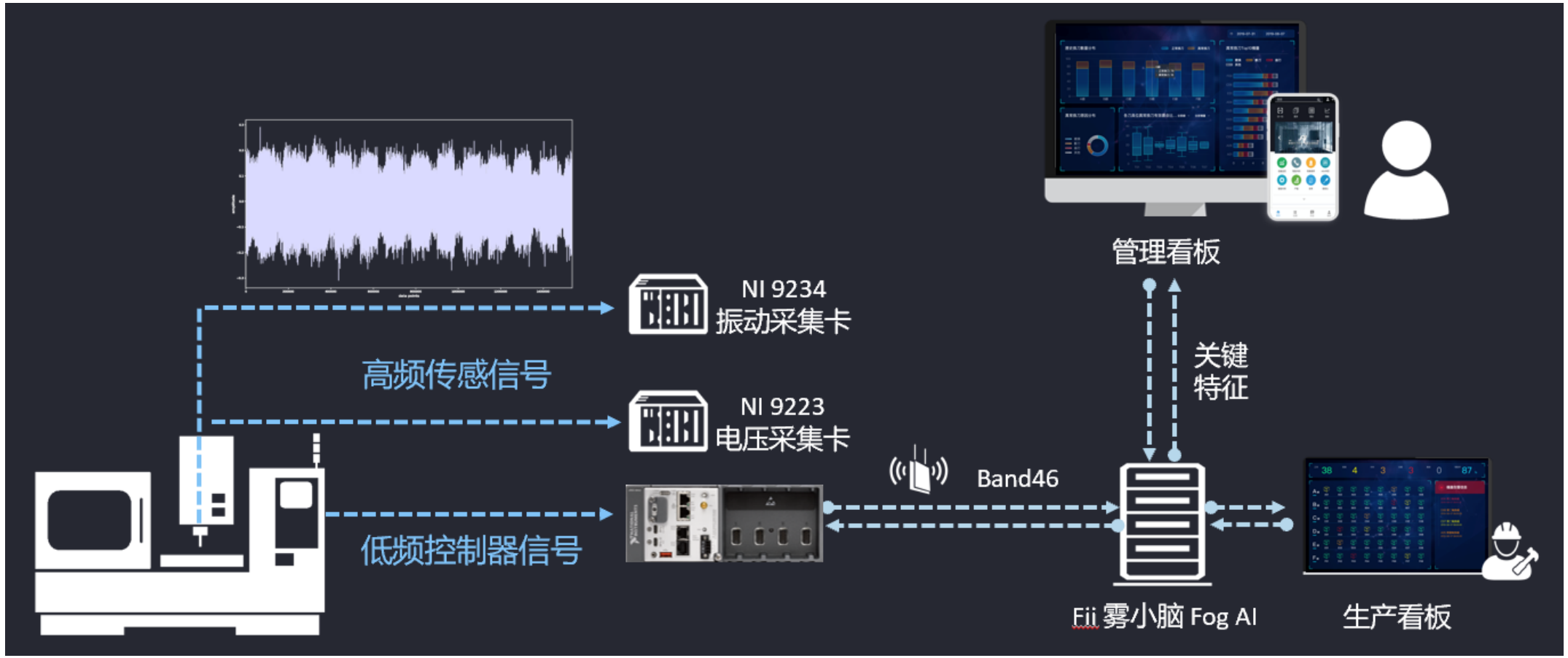


高铁转向架轮对轴承预测性维护方案

NI助力上海振华重工成为智慧港机设备先行者



高端CNC刀具监测与寿命预测



测试资产

生产设备

运营资产

交通运输和
重型设备

帮助传统制造企业从制造商向服务商转型

通过预测性维护，提高正常运行时间

护航中国龙头企业出海

THANKS