

niagara⁴

物联网中间件技术— Niagara介绍

TRIDIUM

霍尼韦尔旗下企业

Agenda

- IoT 物联网/AI技术趋势
- 基于ARM Niagara Solution
- 案例说明

AI 人工智能新技术

The Machines at the Gates

Healthcare

Image to diagnosis
Prescriptive medicine
Computer vision for detection
Personalized Medicine
Automated Patient Follow Up
Smart Buildings
Virtual Facility Manager
Predictive Maintenance
Smart Alarms to Diagnosis
Personalized Comfort
Energy Savings
Biometric Security
Green Buildings
Improved Space Utilization

Automation

Intelligent (robotic) manufacturing
Robotic Warehouses
Automated Retail

Publishing

Reports
Articles

Machine Learning

Deep Learning
Predictive Analytics

Computer Vision

Image recognition
Computer Vision

Artificial Intelligence

Natural Language Processing

Speech transcription
Speech translation
Information extraction

Retail and Customer Service

Chat Bots, Alexa
Customer Retention
Recommendation Engine
Customer Experience – Amazon Go

Transportation

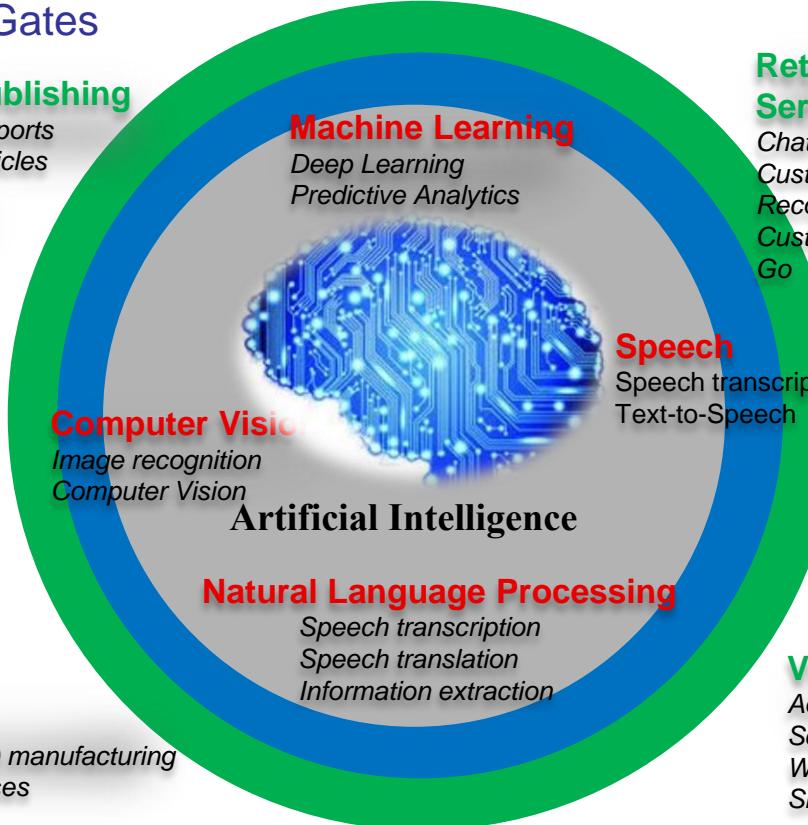
Self-driving cars
Drones
JIT Supply Chain
Autopilots

FinTech

HFT
Fraud Detection
Offer
Personalization
Wealth Management

Virtual Assistant

Advisory
Scheduling
Wearables
Smart Medical Devices

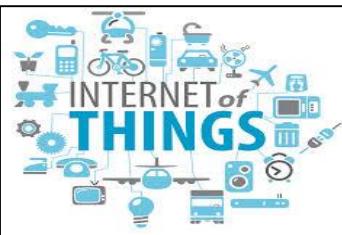


Trend towards Smart Buildings

Controls on plant –
Cloud connected



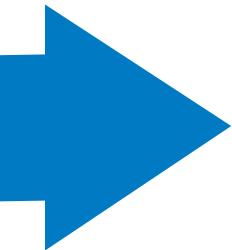
Smart homes



IoT

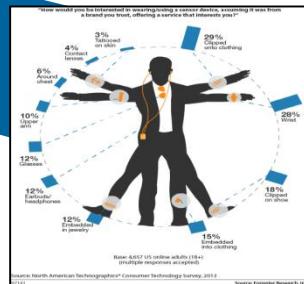


Analytics / Cloud /
Cybersecurity



Green gets trendy – Google new
HQ building

Wearables



Mobility / Apps



Wireless
Communicating
Controls



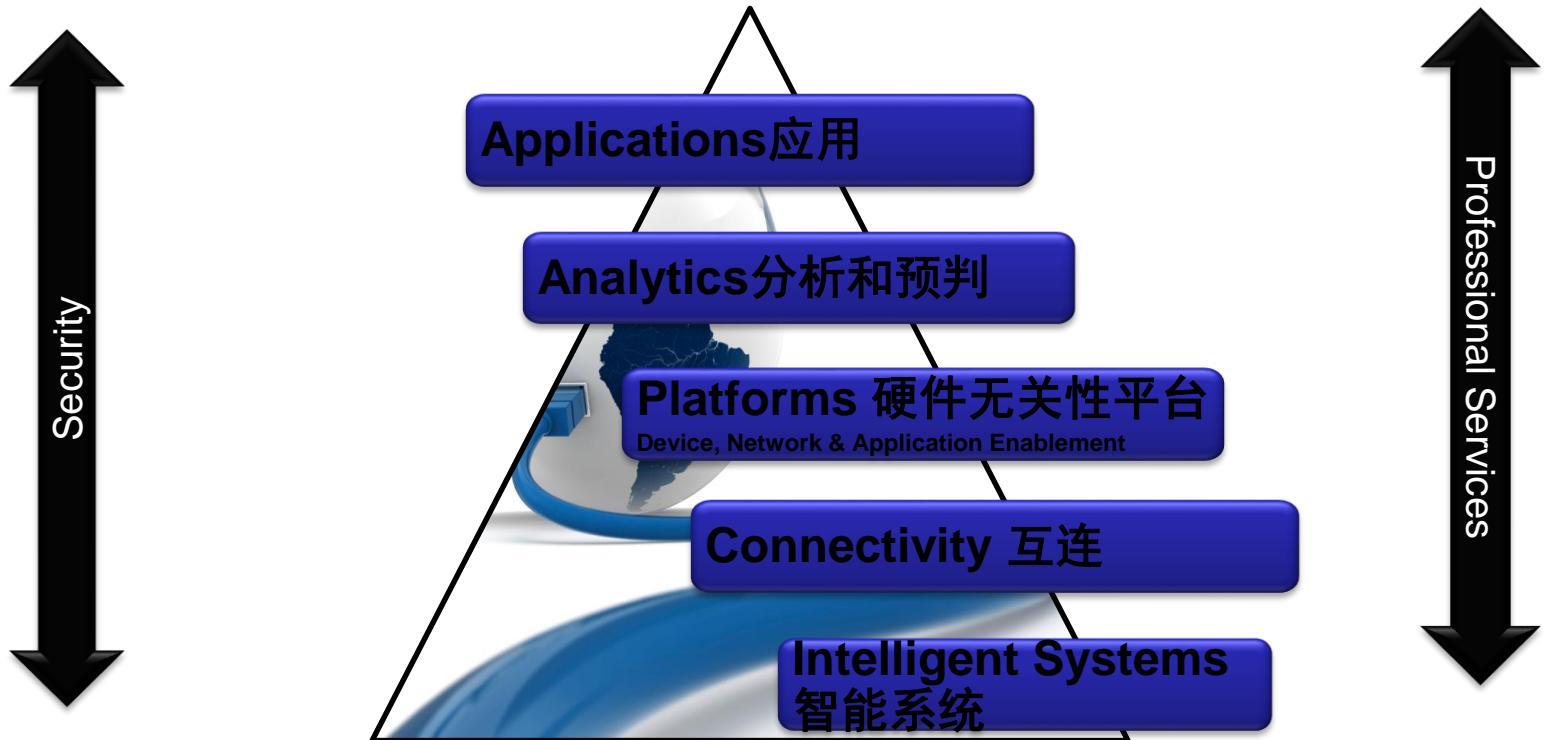
LEDs



Modular / Off-site
construction



IoT 架构下自控系统细分

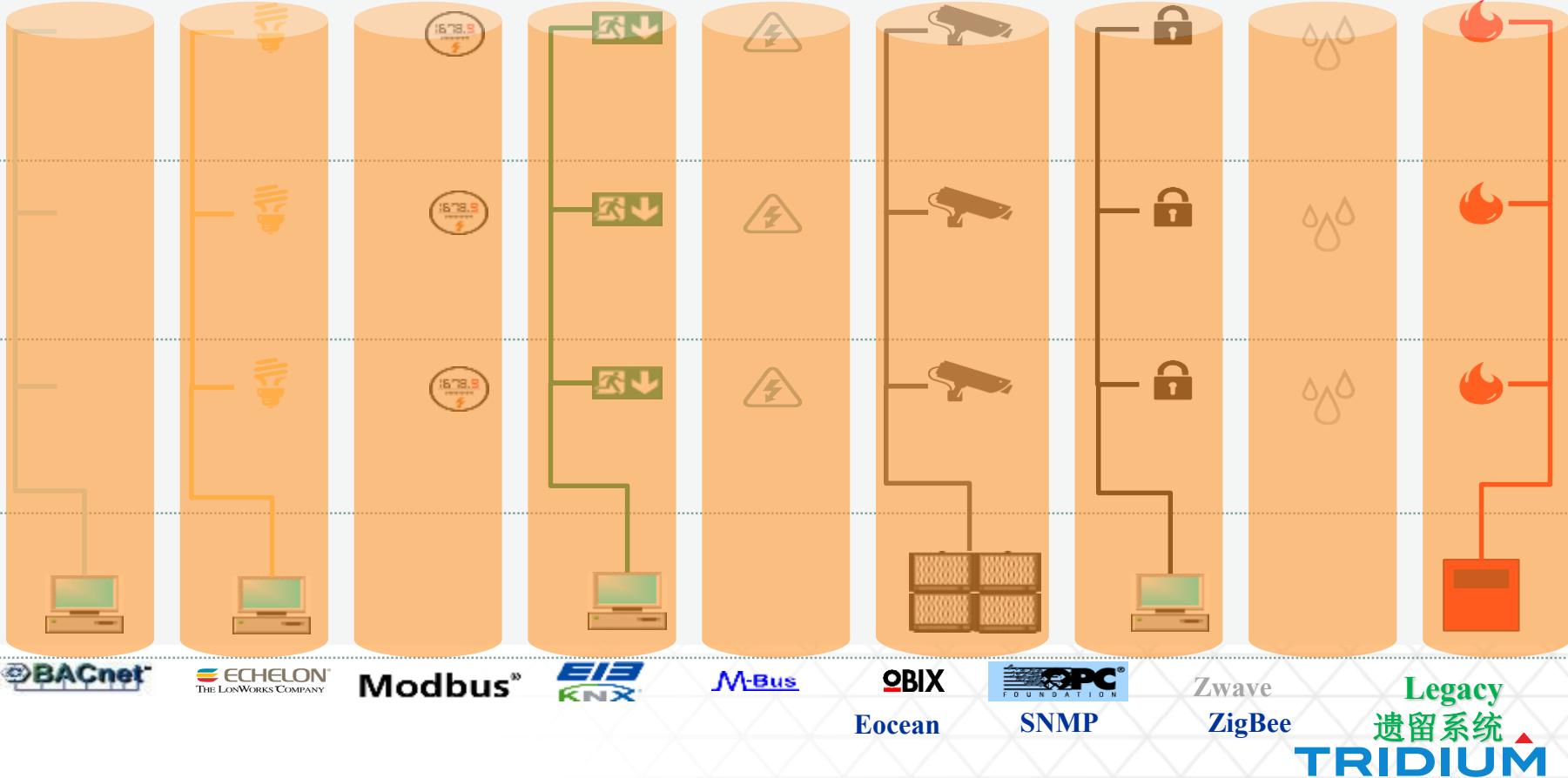


智能楼宇控制现状挑战

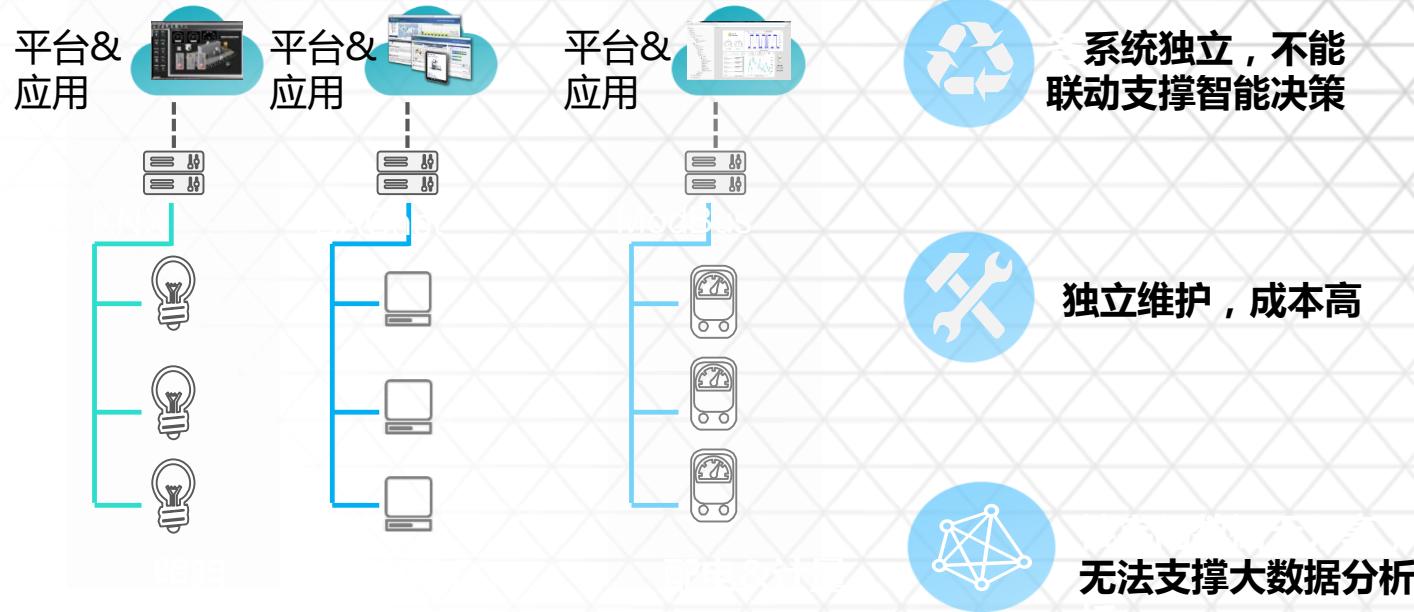


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Challenge 1- 异构系统数据类型复杂

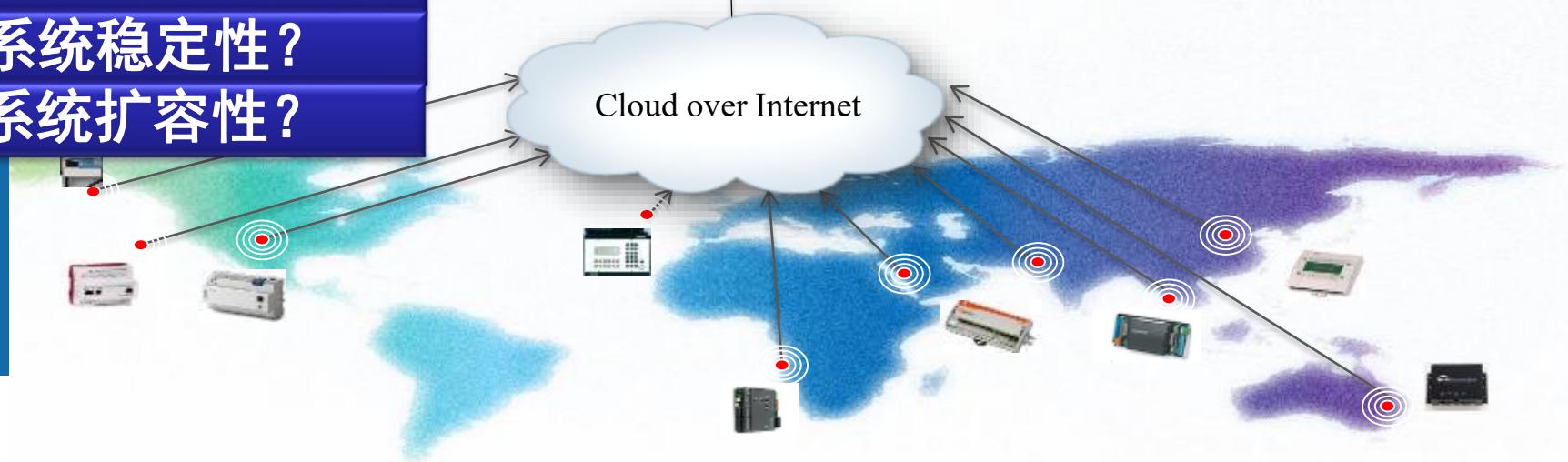


Challenge 1- 异构系统数据类型复杂



Challenge2- 跨地域、园区的整合连接

- 数据实时性?
- 数据完整性?
- 数据安全性?
- 系统稳定性?
- 系统扩容性?



Challenge3- 安全的连接



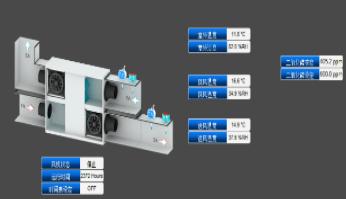
The image shows the Shodan homepage. At the top, there is a navigation bar with links: Shodan, Exploits, Scanhub, Maps, Blog, and Membership. Below the navigation bar is the Shodan logo and a search bar. The main headline on the page is "EXPOSE ONLINE DEVICES." followed by a list of device types: WEBCAMS. ROUTERS. POWER PLANTS. IPHONES. WIND TURBINES. REFRIGERATORS. VOIP PHONES. Below this list are two buttons: "TAKE A TOUR" in red and "FREE SIGN UP" in green. To the right of the text is a world map where most countries are highlighted in red, indicating they have online devices exposed. In the top right corner of the page, there is a large, semi-transparent image of a person wearing a black balaclava and hood, sitting at a computer keyboard. The background of this image is a grid of binary code (0s and 1s). The word "Bad Guy" is written in blue text above the person's head.

Popular Search Queries: Router w/ Default Info - Routers that give their default username/ password as admin/1234 in their banner.

Challenge4- BIM等新的应用需求

设备管理

企业天地2# 楼宇自控系统 东区 AHU 机组



无故障 过去 72 小时 已监视

运行事件

操作事件

未确认事件 & 报警

响应时间 故障率 能耗

last 24 hours

Response time Requests

30 ms 20 ms 10 ms 0 ms

1.5k / min 1k / min 500 / min 0 / min

20:00 26. Feb 04:00 08:00 12:00 16:00 20:00

数据范围: 今天, 08:22 - 19:54 看看详细数据记录

南京长江都市楼宇科技有限责任公司 © 2012 www.trenerg.com. All rights reserved.

设备结构模型 - 企业天地1#

对象 添加对象

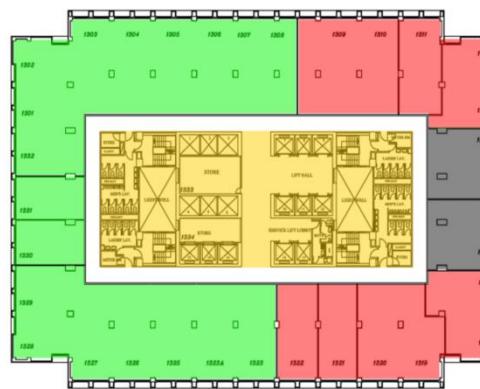
- 楼宇自控系统
- 冷水机组
- 冷却塔
- 冷却水泵
- 火灾报警系统
- 电梯系统

时间 index_audit

状态 编辑 下载 数据透视表 文档

空间管理

企业天地2# 5 层



在用空间 租期临近空间 可用空间 公共区域

区块信息 客户 面积 类型 状态

物业信息 基金帐户 余额 2865.3 元 >

电费查询 最近应缴月份 2 >

水费查询 最近应缴月份 1 >

燃气费查询 最近应缴月份 2 >

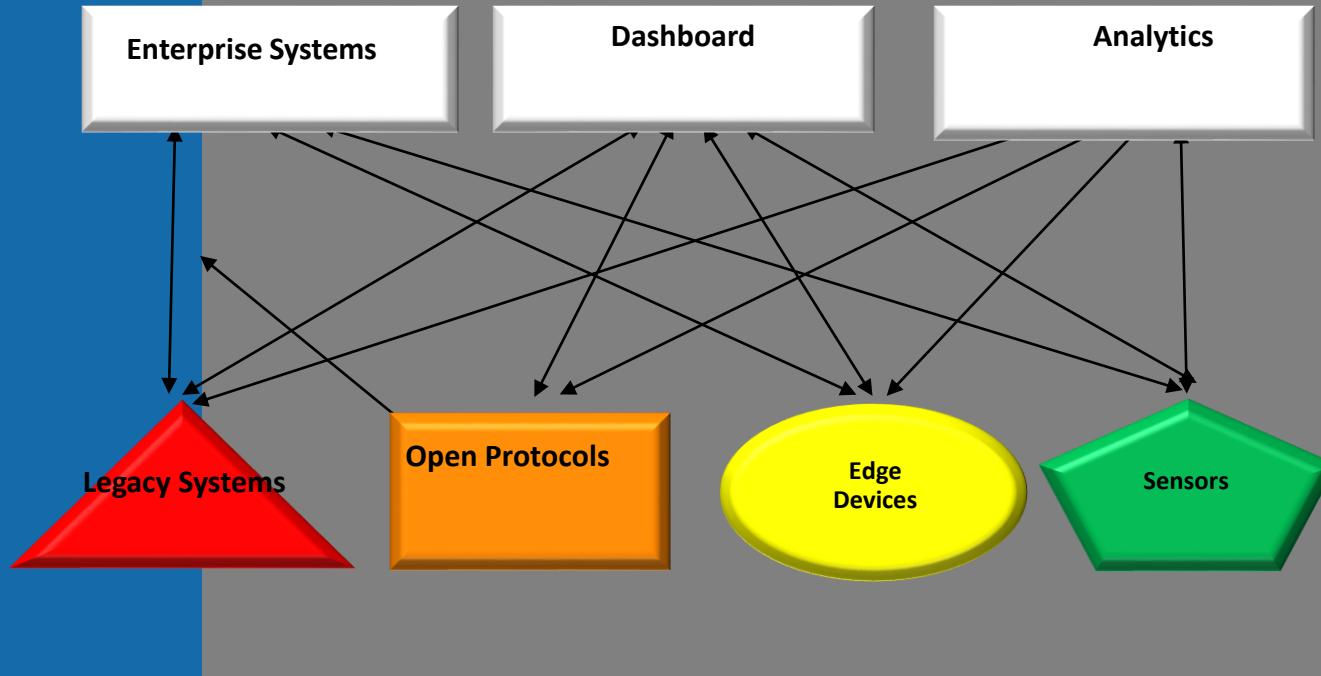
账单

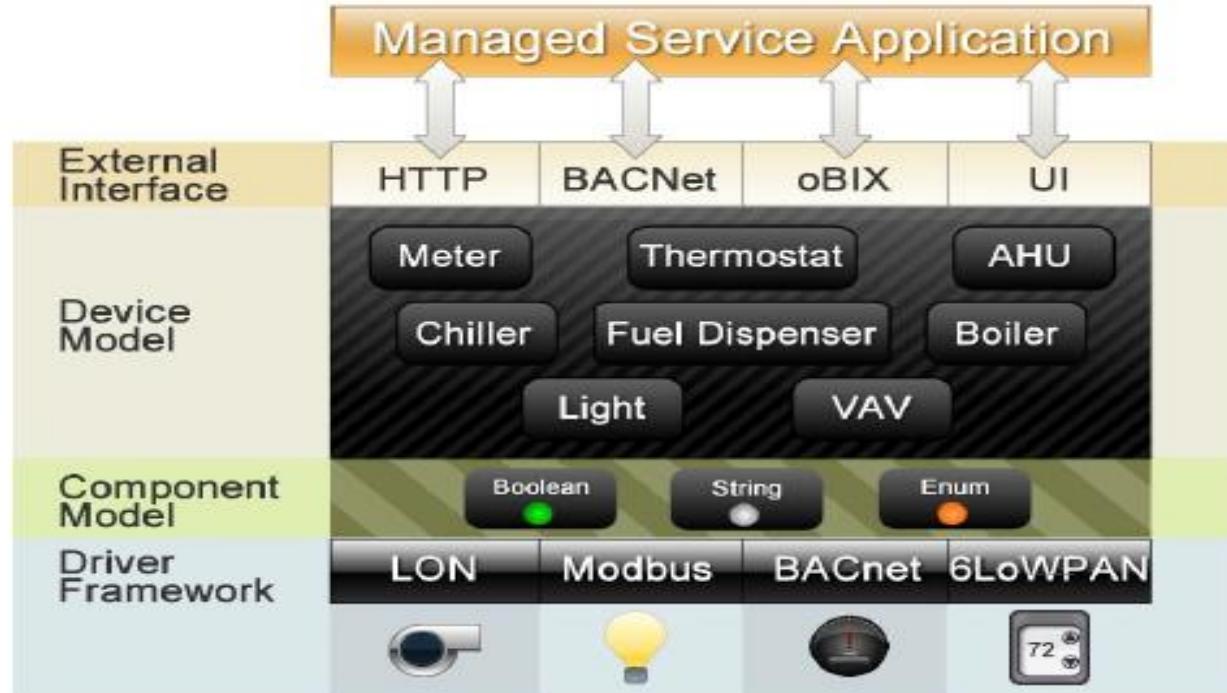
信用及评价 综合评分 ★★★★☆

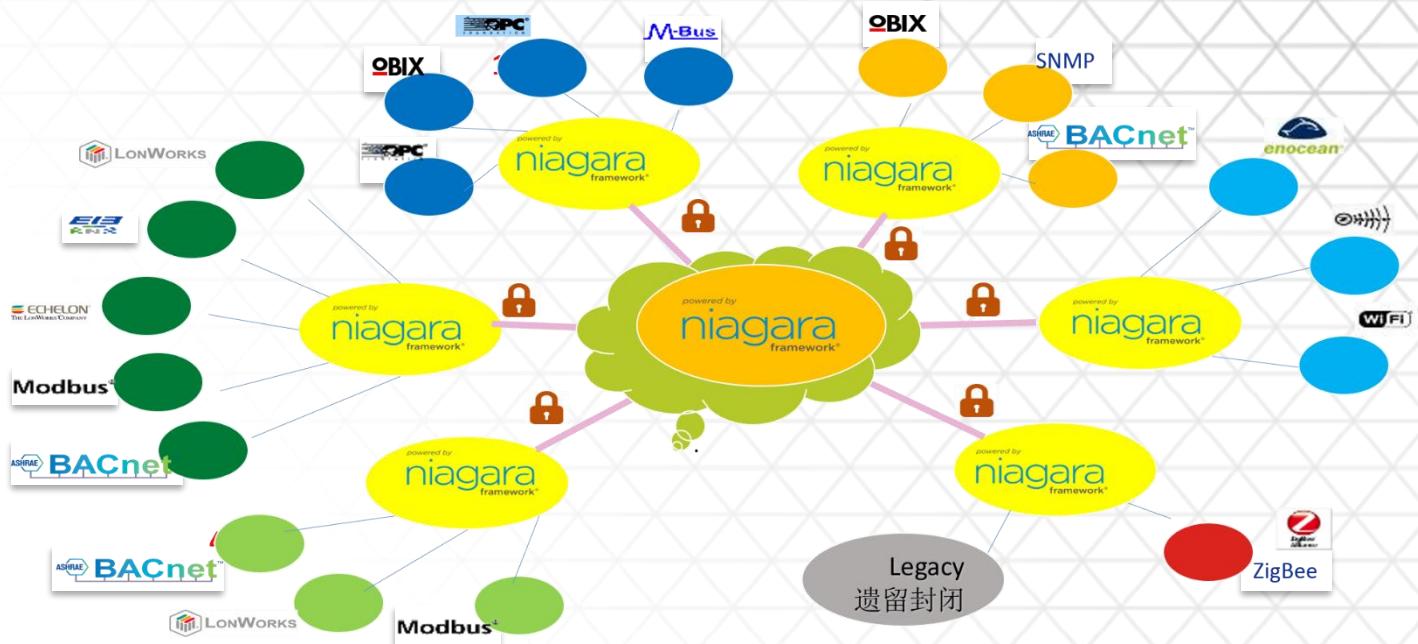
108 2/32 96 单位面积能耗 挖掘水平排名 合计评分

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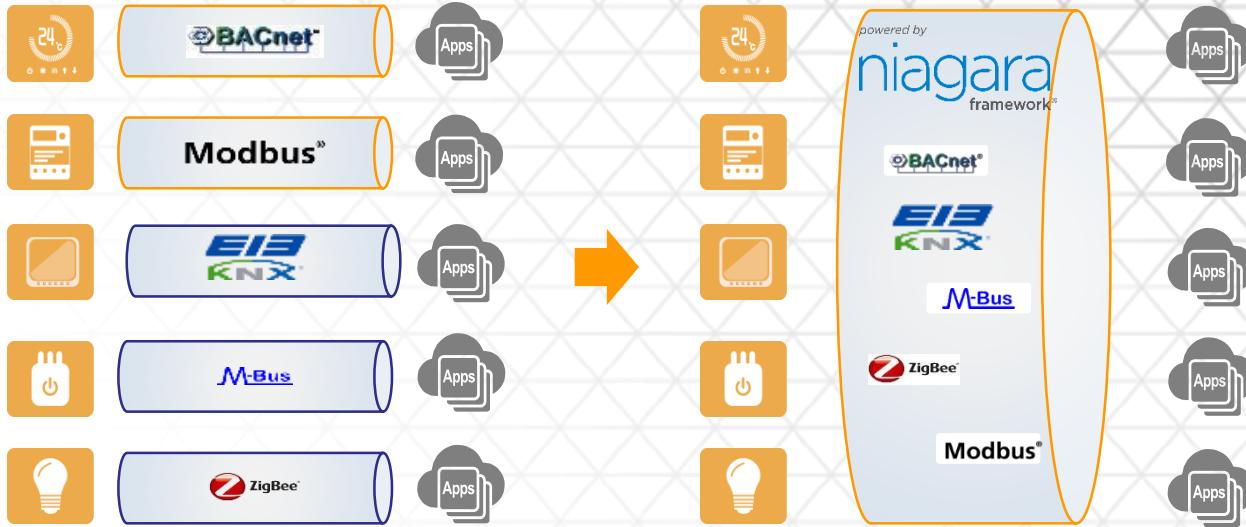
Niagara分布式中间件技术





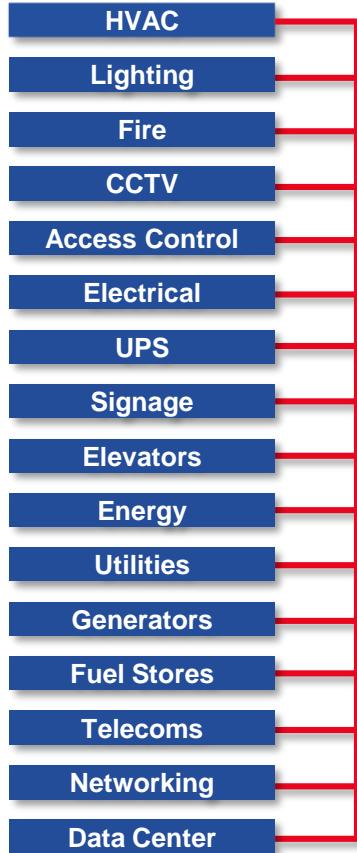


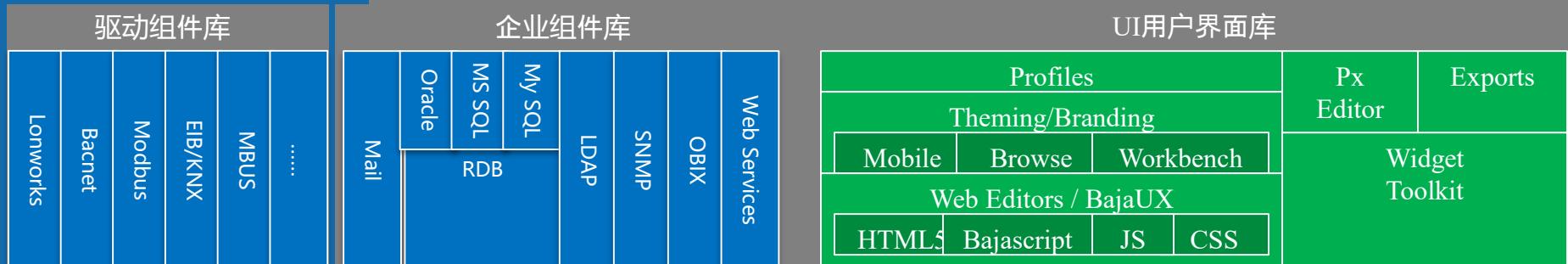
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Niagara分布式硬件无关性中间件技术平台

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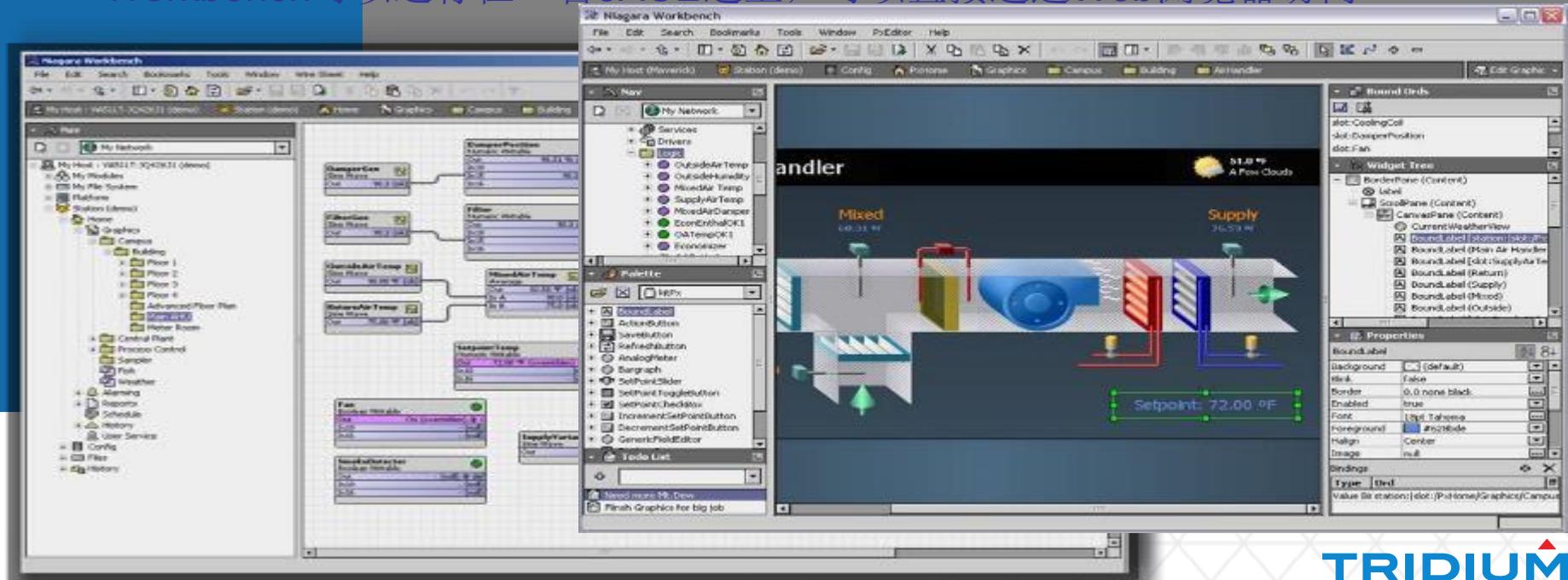
平台服务组件

History 历史	Scheduling 时间表	Converters 类型转换	Event 事件	Web服务 Servlets	Driver Ndriver	Search 搜索 BQL	Tag Dic 标签字典 Hierarchy 层级	Provisioning Backup 备份
Alarm 报警								
Control 控制						NEQL	Series Transform	Report 报表

基础组件 - Baja (Niagara Foundation)

开放分布式应用开发框架 - 统一应用开发工具Workbench

- 是一个集成开发工具，包括业务建模，用户界面设计，驱动开发等。
- 可以对Niagara & Sedona Frameworks编程
- Workbench可以运行在一台JACE之上，可以直接通过Web浏览器访问



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系统集成

powered by

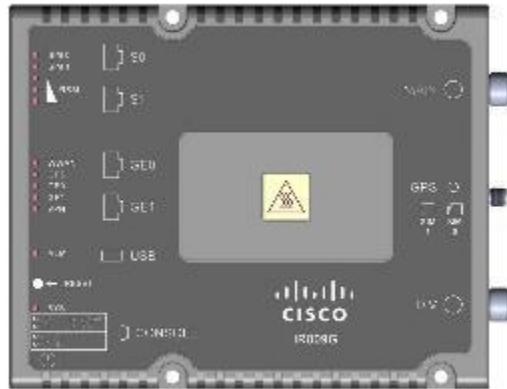
niagara
framework®
Supervisor



- 参数

- TI AM3352 : 1000MHz Cortex™-A8
- 1GB DDR3 SDRAMARM®
- 4GB SD工业闪存
- Wi-Fi (客户端或WAP)
- USB 连接器，备份与恢复
- 2个独立RS-485
- 2个100MB 以太网端口
- 安全启动
- 24V交流/直流电源
- 运行Niagara 4.1或更新版本
- 实时时钟
- 无电池

移植Niagara



Niagara Framework 4.2

Niagara Run Environment
Native API Implement
C代码移植

Java Run Environment
J2SE Java8 compatible JRE

OS: QNX / Windows / Linux

Hardware: x86 / PPC / ARM
CPU 500M+ / RAM 256M+/ FLASH 256M+

◦

移植Niagara Edge Micro

Niagara Workbench

云端



编程



云端通讯

Native API Implement
C代码移植和自定义功能块

OS: Linux / ucOS / ...

Hardware: ARM

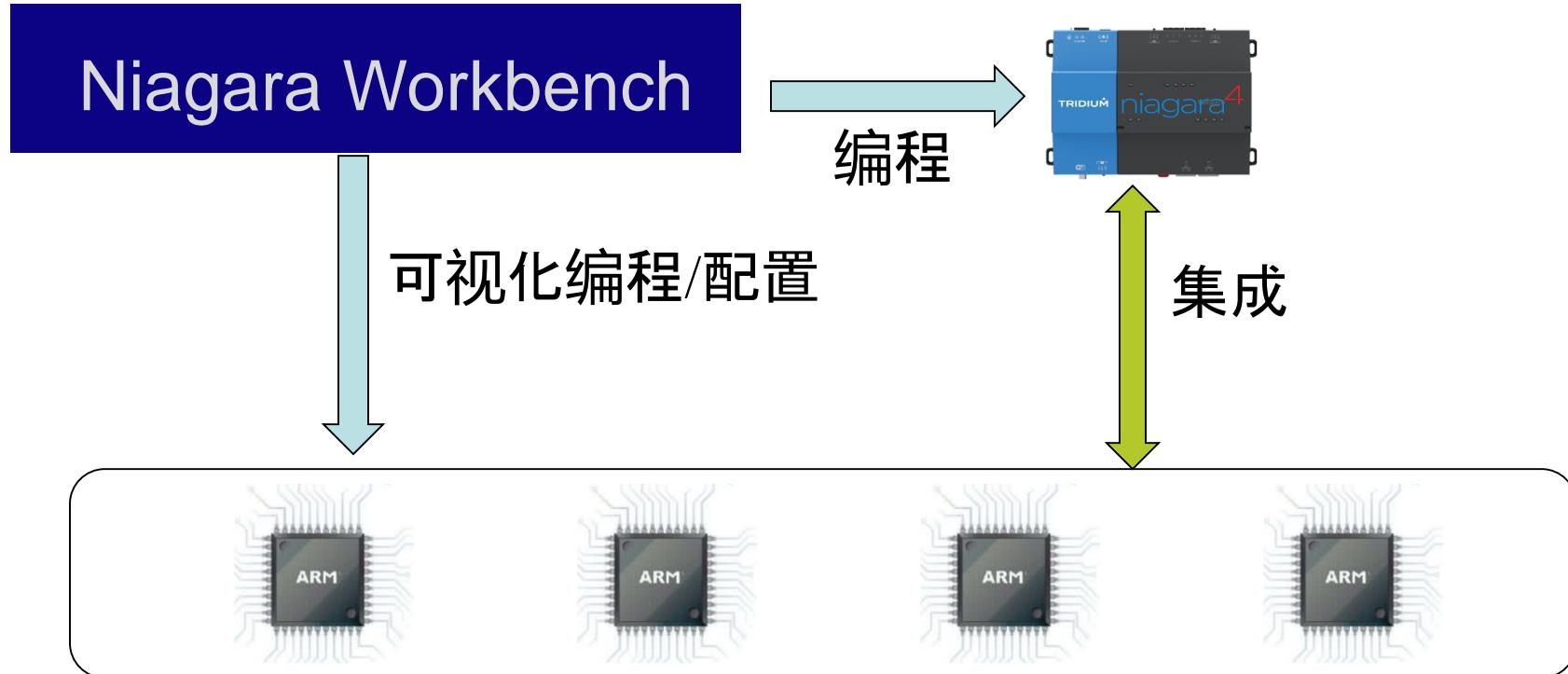
CPU 10M+ / RAM 128K+/ FLASH 128K+

备注:

Niagara Edge Micro可以将普通的嵌入式硬件变成可二次编程的智能设备。

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编程、集成工具



备注:

Niagara Workbench是一个可定制的可视化编程工具

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Niagara 分布式软件和控制器

Supervisor
Server

niagara⁴ Powered by niagara^{AX}



Supervisor
Controller-
JACE



IP DDC/IO



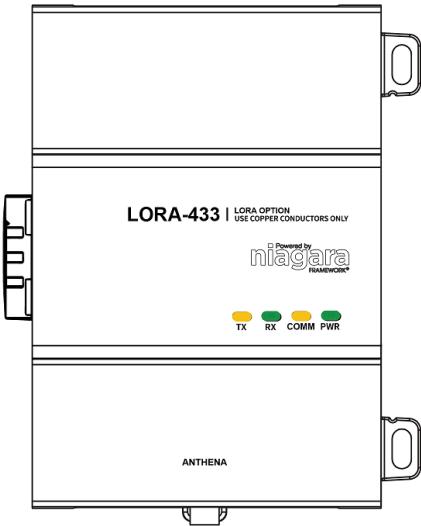
Devices



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Niagara LoRA Solution

- **LoRa/NB-IoT节点**



- ✓ JACE8000通过LoRa/NB-IoT连
接到云服务器
- ✓ 远程监管/控制, 报警

Niagara LoRA solution



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NAF分析平台工具

niagara analytics 2.0

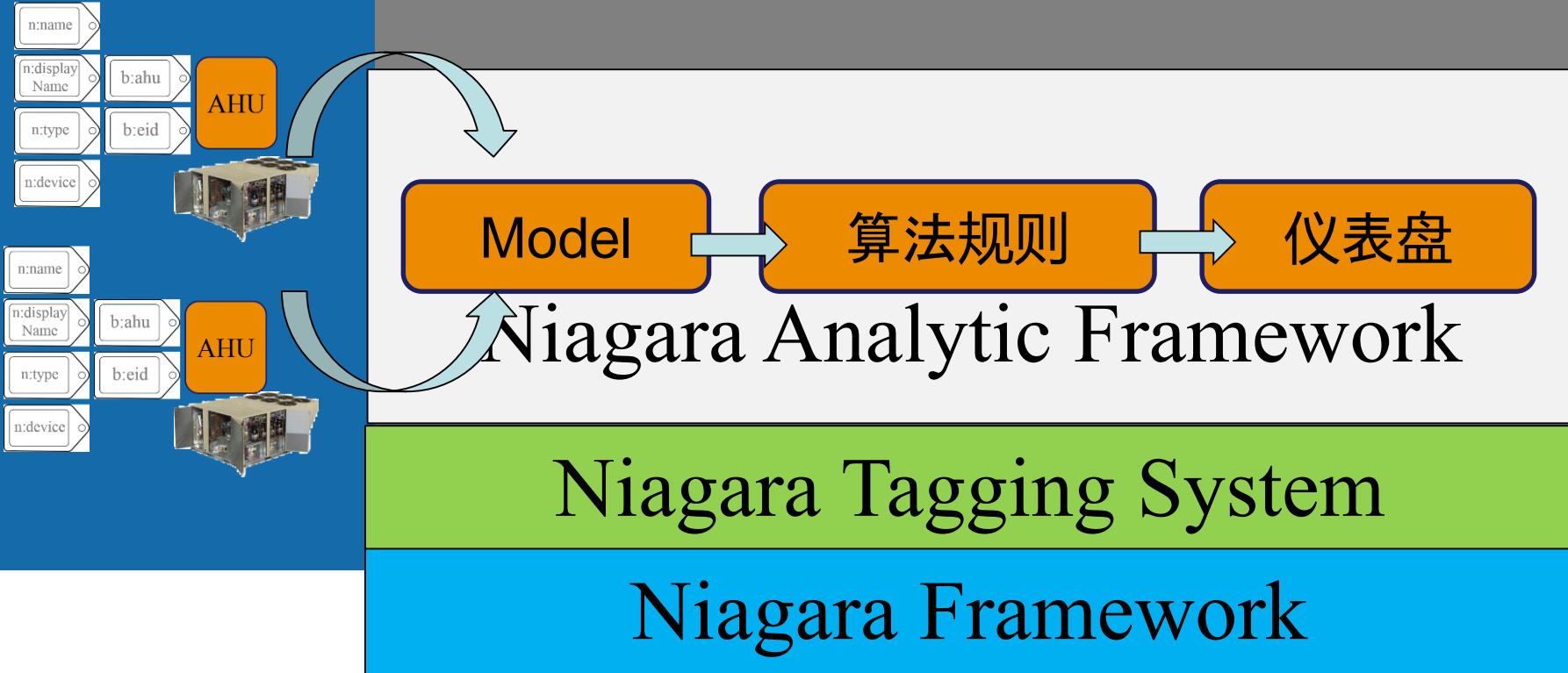
Compatible with Niagara 4 | Available now

The screenshot displays the Niagara Analytics 2.0 software interface. On the left, there is a navigation pane ('Nav') containing a tree view of services: My Network, AlarmService, AnalyticService (selected), Alerts, Algorithms, Definitions, Pollers, and AuditHistoryService. Below this is a palette ('Palette') showing the 'analytics-lib' library with various metrics like ChilledWaterMixing, ChilledWaterUsageM, ChilledWaterUsageM, ChilledWaterUsageF, ChilledWaterUsageF, CoolingValveOpen1, and DamperOpenDuring. The main area is titled 'Property Sheet' and shows properties for the selected 'AnalyticService' service. The properties listed are:

Property	Value
Status	{ok}
Fault Cause	
Enabled	true
Rt Version	2.0.110
Wb Version	2.0.110
Ux Version	2.0.110
Alert Count	2
Algorithm Count	112
Point Count	131
Proxy Ext Count	3
Caching	false
Cache Built	true
Caching Startup Delay	1
Auto Tag Analytic Point	true
Test Cov Neql	hs:hisInterpolate = 'cov'
Test Totalization Neql	hs:hisTotalized

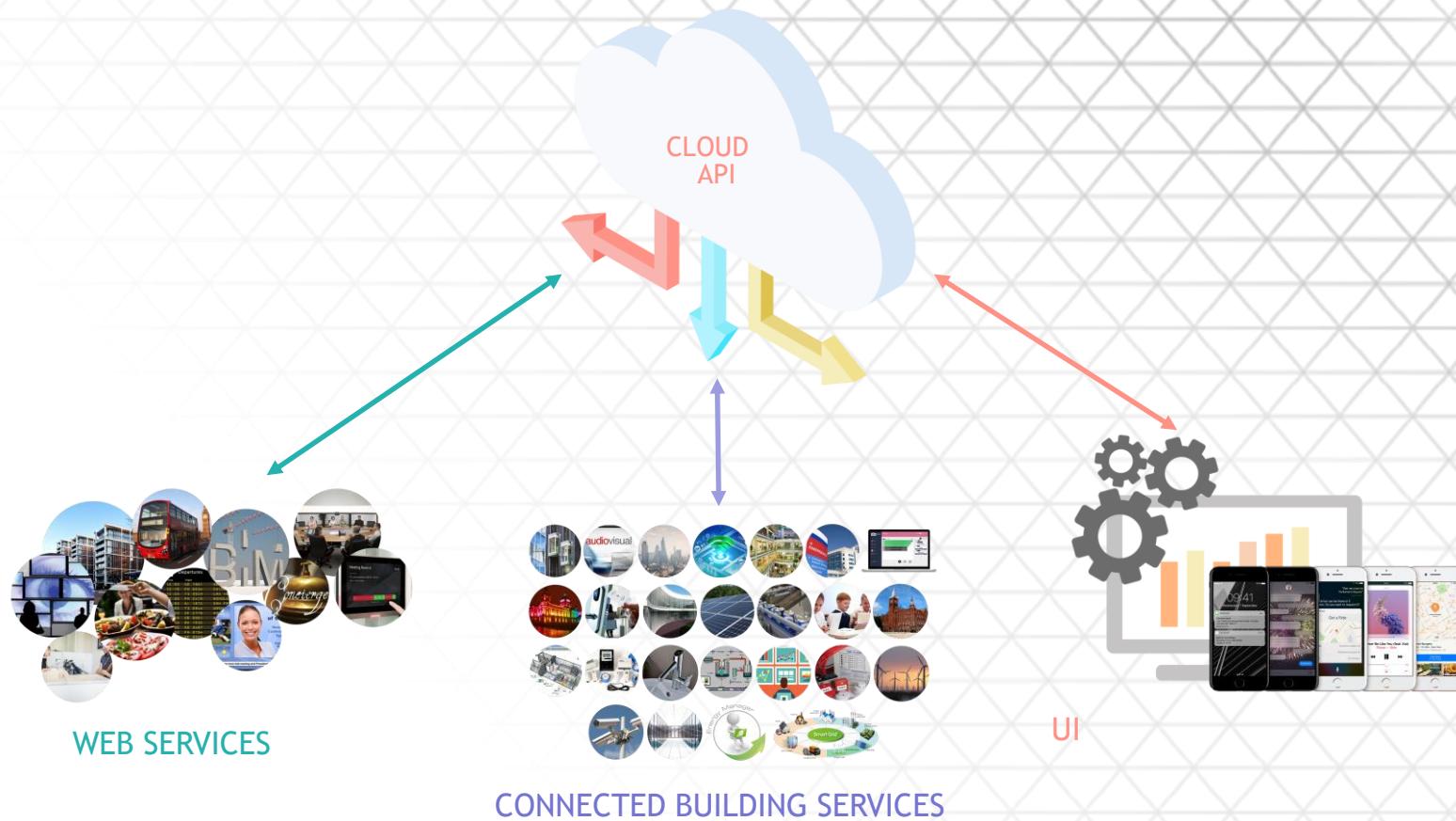
At the bottom right of the Property Sheet are 'Refresh' and 'Save' buttons.

NAF工具



基于 Niagara 分布式架构

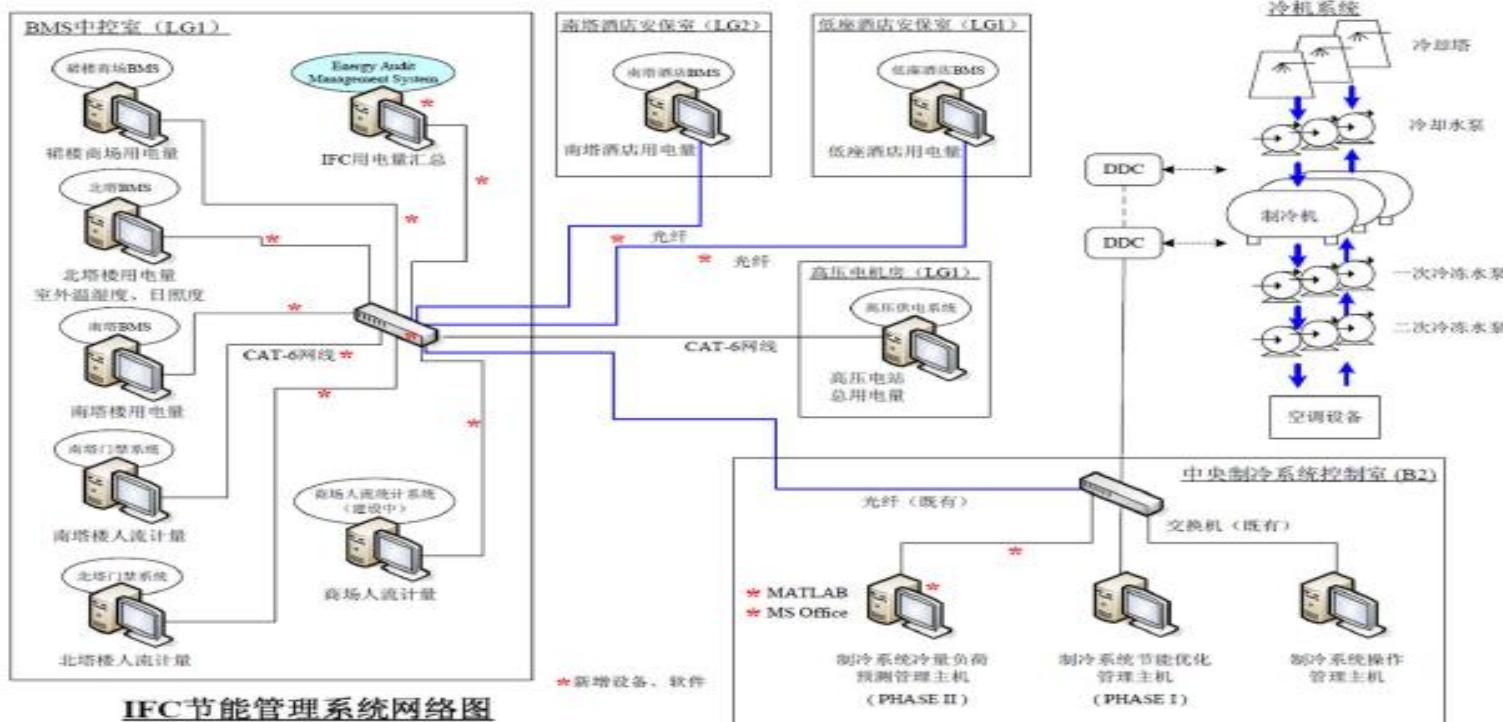




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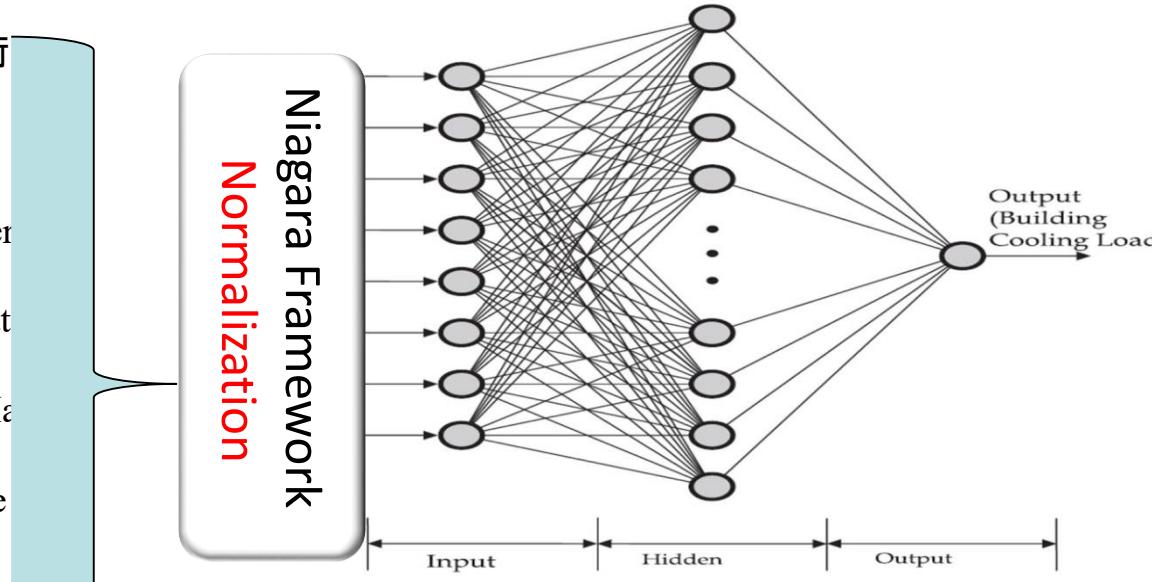
主要案例分享

IFC - Cool Load Predication 负荷预判



IFC - Cool Load Prediction 负荷预判

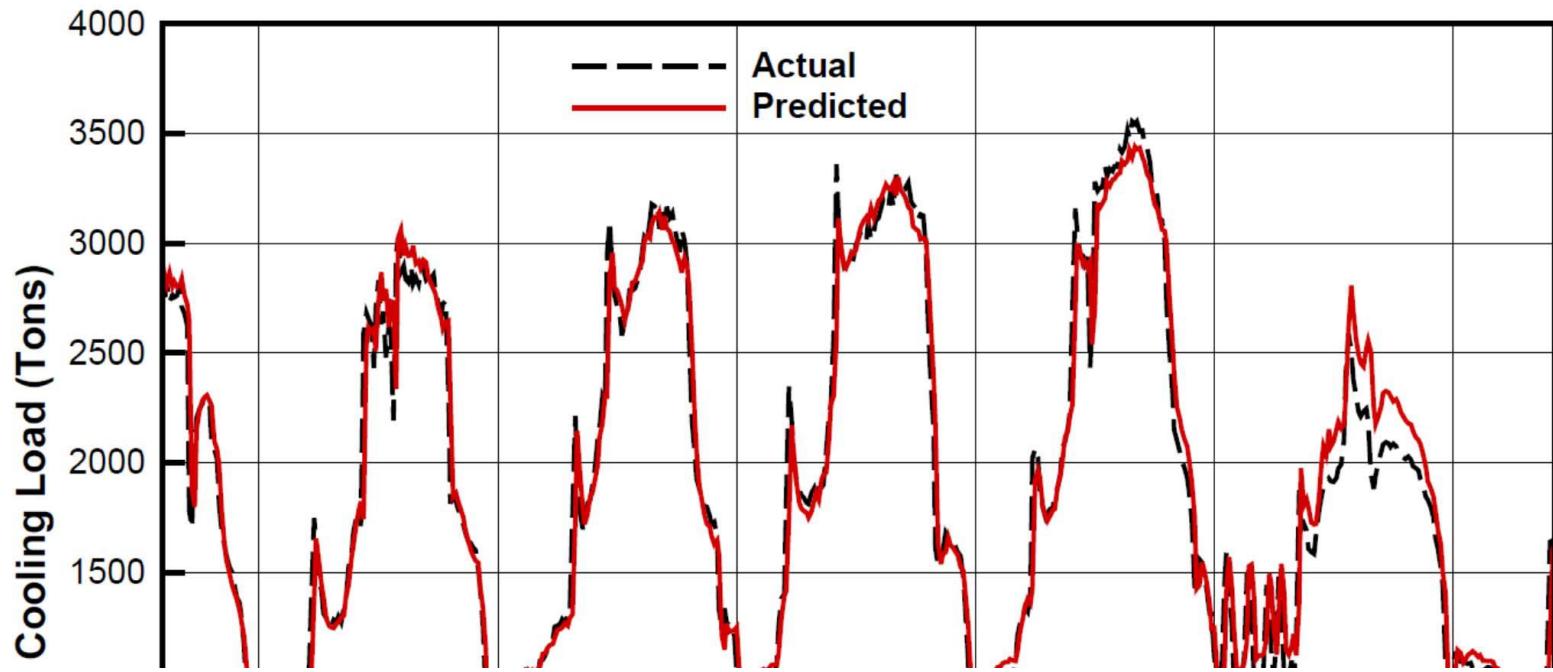
Real time cooling load 实时负荷
Temperature 温度
Relative Humidity 湿度
Solar irradiance 阳光辐射率
Occupancy Rate of Office Tower 办公入住率
Landlord power consumption rate 业主电量消耗统计
Occupancy Rate of Shopping Mall 商场人流量统计
Tenants power consumption rate 租户电量消耗统计



-Niagara 标准各入口数据统一格式
-数据分析工具提供消除干扰信号手段

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预测与实际负荷对比



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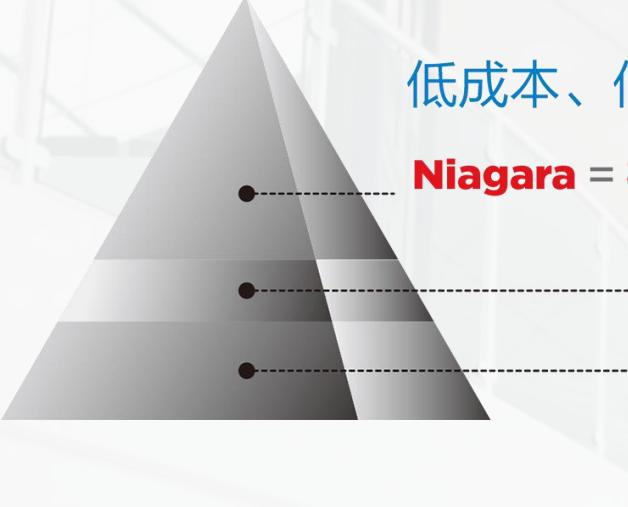
- 1997 Tridium在美国弗吉尼亚州里士满成立
- 1999 推出第一代Niagara Framework以及基于Web技术的楼宇自动化和能源管理解决方案的Vykon品牌
- 2000 与包括霍尼韦尔、施耐德、艾默生等知名行业公司达成战略合作
- 2004 举办首届Niagara峰会
- 2005 霍尼韦尔宣布收购Tridium，成为霍尼韦尔国际旗下独立的全资子公司
- 2006 推出Niagara Central，作为Niagara社区的互动门户
- 2008 Niagara Framework的安装实例超过100,000个
- 2010 Niagara Framework的安装实例超过200,000个
- 2012 Niagara Framework的安装实例超过300,000个
- 2013 中国独资公司成立，大力开发中国及亚太市场
- 2015 Niagara Framework的安装实例超过500,000个，推出新一代IOT平台——Niagara4

- 1998 – Niagara R1
- January 2000 – Niagara R2
- June 2005 – Niagara AX 3.0

- 2015



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低成本、低风险、可持续开发属于你的行业应用软件系统

Niagara = 框架内核 + 可重用的组件和驱动库 + 开发工具 + 生态体系

传统软件平台 = 基础框架 + 组件库 + 配置工具（异构 / 变化）

传统应用软件 = 基于特定需求的软件系统



- 55+ 国家地区
- 3,000+ 系统集成商
- 100+ OEM 厂商
- 12,000+ Niagara知识社区在线用户
- 16,000+ 认证应用工程师
- 400+ 认证开发工程师
- 400,000+ 安装部署实例
- 10,000,000+ 接入的智能设备

China Partners 中国合作伙伴



Global Partners 全球合作伙伴



Alliance Partners 联盟伙伴



排名不分先后

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THANK YOU

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谢谢