iSCADA

Technology Driven
Facility & Asset Management

This paper provides insight into the application of eMaintenance concepts and Internet technologies in facilities & asset management, and looks at how some Malaysian facilities managers address challenging FM issues such as:

- Effectively managing large facilities portfolio spread over a wide geographical area
- Enhancing transparency in maintenance management
- Maximizing facility uptime
- Prolonging the economic life of facilities and assets.

Technology driven
Facilities & Asset Management (FAM)

We live in an age where virtually every business process is being positively impacted by increasingly pervasive Internet technologies. eCommerce, eBanking, eMail and eGovernment are some of the more prominent examples of how the Internet has introduced an unprecedented level of efficiency, and changed the way commercial, financial, business communications and government services are delivered.

Maintenance Management Evolution

The facilities and asset management sector has come a long way since the days when all maintenance tasks were handled manually.

With the mass adoption of computers in business processes since the 1980's, Computerized Maintenance Management Systems (CMMS) have been widely used by facilities managers (FMs) to manage:-

- Database of spare parts, suppliers and inventories
- Work orders, purchasing and downtime calculations
- scheduled and unscheduled maintenance tracking & reporting

As the scope and size of facilities being maintained increases, FMs began adopting enhanced CMMS technologies, more commonly referred to as "Enterprise Asset Management" (EAM) systems. The industry progressed from using stand-alone computers running relatively simple and passive CMMS processes, to adopting locally networked EAM systems capable of managing large scale, more mission critical maintenance processes like:-

- Real-time facility performance
- Condition-based monitoring for proactive maintenance
- Remote diagnostics and analysis

The first wave of evolution began in the 80s when widespread adoption of computers and stand-alone software technologies moved the FAM industry from conventional to computerized maintenance.

We are in the midst of the second wave of evolution that began with the mass adoption of very pervasive Internet technologies just before the turn of the century. Visionary FMs were among the early adopters of eMaintenance – an electronic maintenance management concept that uses real-time data delivered over the Internet. Just as eBanking and eCommerce changed forever the financial and commercial landscape, eMaintenance is set to do the same for the FAM industry.

The eMaintenance model

Conventionally, maintenance personnel at each facility manages data from multiple systems like CMMS, EAM, BAS, and IBMS, all of which are vendor specific, stand-alone and typically do not "talk" with each other. In modern facilities, sophisticated BAS or IBMS monitor and control thousands of points. While these are essential for automation and useful for control engineers, maintenance personnel on the other hand are often interested in only a few high level alert points for monitoring purposes. To access them, one has to wade through these complex systems, each storing information in separate machines.

Sidebar

Maintenance Management Evolution

eMaintenance

↑ 2000

Computerized

↑ 1980

Conventional
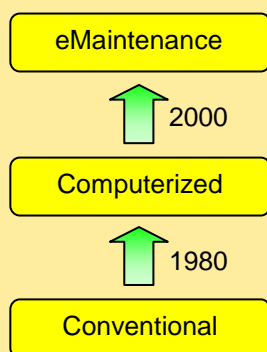
Visionary FMs were among the early adopters of eMaintenance

The problem is compounded for FMs maintaining large groups of facilities all potentially having different and incompatible automation or management systems from different vendors.

iSCADA's model of eMaintenance addresses this issue through the deployment` of embedded Internet gateways to extract only relevant maintenance-related information at source, often bypassing the existing BAS or IBMS. It then releases the data from the confines of the control room or local office by transmitting them directly to a central server on the Internet. Similar data from all sites are consolidated, processed and delivered in real time to the desktops and mobile devices of technicians and decision makers at all levels of management.
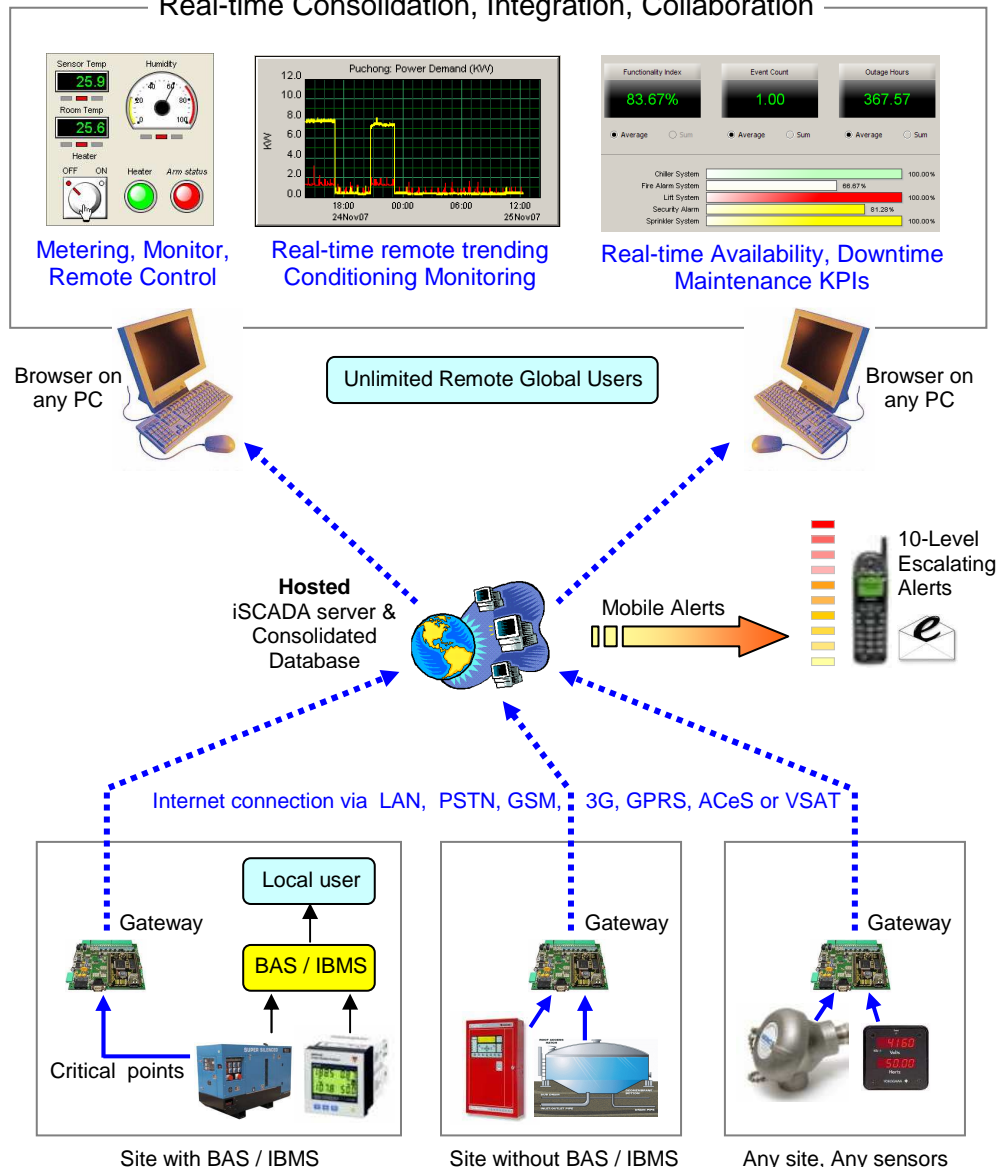
Whilst BAS, IBMS, etc are operational and automation tools, iSCADA is a specialized eMaintenance tool, designed specifically for implementing eMaintenance to efficiently manage large asset bases spread over wide geographical areas.

In facilities without any BAS, IBMS or EAM system, iSCADA provides the essential real time data to complement any CMMS software the FM may be using. iSCADA's API ensures that data can be easily shared across other enterprise systems.

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iSCADA architecture

Real-time Consolidation, Integration, Collaboration

Metering, Monitor, Remote Control

Real-time remote trending Conditioning Monitoring

Real-time Availability, Downtime Maintenance KPIs

Browser on any PC

Unlimited Remote Global Users

Browser on any PC

10-Level Escalating Alerts

Hosted iSCADA server & Consolidated Database

Mobile Alerts

Internet connection via LAN, PSTN, GSM, 3G, GPRS, ACeS or VSAT

Local user

Gateway

BAS / IBMS

Gateway

Gateway

Critical points

Site with BAS / IBMS

Site without BAS / IBMS

Any site, Any sensors
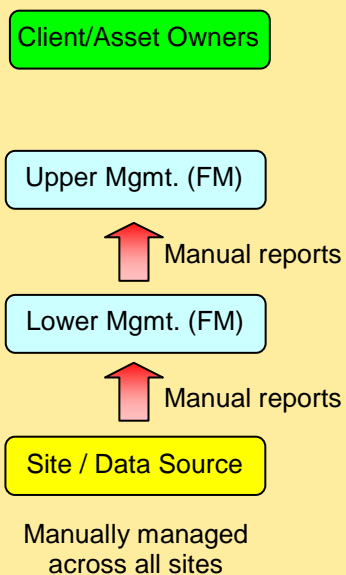
Benefits of eMaintenance using iSCADA

- **Efficiency** - Today's FMs operate in an exciting yet challenging environment, where their portfolio of facilities run into hundreds or thousands, often spread over wide geographical areas. iSCADA's ability to deliver *consolidated data* from any location and *integrated data* from any system provides the platform for FMs to manage their tasks more efficiently.

  Routine inspections is reduced when real time monitoring is in place. Downtime computation is fully automated with machine-generated data. Having direct access to online reports reduces manual reporting, especially from branch or regional offices.
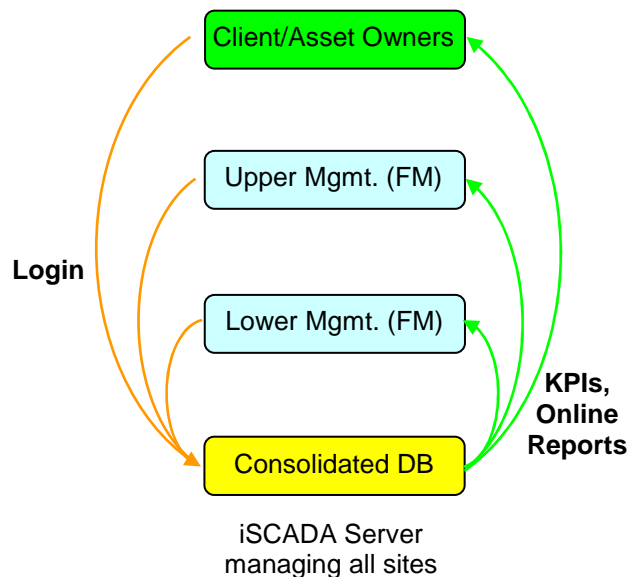
  Online collaboration over a common set of real time data translates into savings in human resources. For example, analysis of conditioning monitoring data like vibration and temperature profile, power quality, energy utilization and water usage profile can all be done by a single team of experts at the headquarters instead of deploying them at every site.

  Shared resources, coupled with iSCADA's Hosted Services model of service delivery makes conditioning monitoring and pro-active maintenance more affordable and simpler to implement compared to traditional solutions like EAM software. This translates into wider adoption of condition monitoring thereby helping prolong the economic lifecycle of facilities and assets.

Conventional Maintenance Reporting mechanism

Client/Asset Owners

Upper Mgmt. (FM)

⬆ Manual reports

Lower Mgmt. (FM)

⬆ Manual reports

Site / Data Source

Manually managed across all sites

eMaintenance – Efficient & Transparent reporting mechanism

Client/Asset Owners

Upper Mgmt. (FM)

Login

Lower Mgmt. (FM)

Consolidated DB

KPIs, Online Reports

iSCADA Server
managing all sites

- **Transparency** - The key element that sets eMaintenance powered by iSCADA apart from its conventional counterpart is the web-centric consolidated database that is easily available by all levels of management, including clients**.** Machine-generated KPIs provide a transparent and accurate measure of maintenance quality and acts as a benchmark for performance evaluation.

  FMs who adopt this eMaintenance model are able to win the confidence of their clients by objectively verifying Service Level Agreement commitments in a timely and transparent manner.

- **Availability** - In today's competitive environment, there is an ever pressing need for facilities and asset managers to maintain increasingly high facilities uptime.

  "Facility uptime of 99.9% is not enough for today's market. The goal is 99.9999%." - Goldman Sachs

  This is a tall order for FMs, especially so when operating on a regional and global scale. iSCADA's 10-level escalating and recurring alerts management system plays the crucial role of:-

    o immediately alerting the local technician of failures
    o sending out reminders at predetermined intervals as long as the failure persists.
    o sending out second-level alerts to the supervisor if the downtime exceeds a pre-determined threshold.
    o continuing the escalation all the way to the headquarters or the client.

  Once this infrastructure is in place, everyone within the organization will be fully accountable and be on their toes. The end result is high facilities uptime, happy clients, profitable and sustainable facilities and asset management industry.

Featured Applications

- **Publics Works Department, Malaysia (JKR)**
  Maintaining & prolonging the asset life cycle of Malaysia's first world infrastructure using eMaintenance powered by iSCADA.

Prime Minister's Department, Putrajaya

Royal Muzium, Melaka

Istana Iskandariah Palace, Perak

Tasked with the onerous responsibility of overseeing the development and maintenance of the nation's vast public infrastructure and asset base, JKR had the foresight to be amongst the early adopters of eMaintenance.

iSCADA was deployed in its first facility in 2004. Based on the managed services model, JKR was able to effortlessly scale upwards to cover critical facilities nationwide without having to allocate human or IT resources to manage the eMaintenance infrastructure. Some examples of iSCADA in action include:-

    o Benchmarking the service quality of privatized FMs
    o Monitoring of mission critical facilities like security fencing
    o Condition monitoring of compressors
    o Building services monitoring in high profile facilities
    o Environment monitoring of data centers in paperless hospitals

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"Facility uptime of 99.9% is not enough for today's market. The goal is 99.9999%."
Goldman Sachs

Featured Facilities

Customs & Quarantine Complex, CIQ Johor

Hospitals, KL, Selangor, Kedah, Perlis

- **Universities, Facilities Management & Research**

Featured Universities

UTM, Universiti Teknologi Malaysia
Skudai, Johor &
City Campus, KL

Maintaining a 1,222 hectare campus in Skudai, Johor is like managing a small town. One iSCADA Gateway was deployed in 2005 as a pilot project, delivering instant positive results. The solution was then scaled up to over 60 Gateways, managing almost every building service including Lifts, PABX, Water Reticulation, Cooling systems & Server Rooms. Delivered on a hosted, managed services model, this project was scaled upwards effortlessly with no investments in software, servers, IT infrastructure or human resources.

UiTM, Universiti Teknologi Mara
Nationwide

The enormous responsibility of managing and educating a large and diverse student population has resulted in the expansion of the university set-up into a main campus, 3 satellite campuses, 12 branch campuses and 6 city/town campuses. Conventional maintenance based on information from BAS and IBMS is out! Having invested heavily in sophisticated building management systems, only to see them becoming white elephants, UiTM made a strategic decision to embrace eMaintenance for its campuses nationwide – both existing, and new ones being developed.

NTU, Nanyang Technology University
Singapore

Scientific research: iSCADA was deployed at a remote island off Sarawak by researches from NTU and the Sarawak Forestry Corporation for the measurement of sand, nests, and egg temperature during incubation of reptilians - A new approach using Internet-based data acquisition technologies for concurrent analysis of globally consolidated real time data across multiple sites by multiple investigators. The high accuracy, resolution, repeatability, and robustness of iSCADA is illustrated in this real time end-to-end IP-based data acquisition project.

- **Mission Critical Data Centres**

Multinational; 40,000+ Employees Worldwide; Data Centres located in Malaysia and Singapore require real-time in-situ environmental monitoring and trending. iSCADA was deployed to monitor UPS system, electrical system, temperature & humidity, precision air conditioners, water detection and fire suppression systems.

Conclusions

The pervasive Internet is beginning to engulf the FAM industry the same way it has other industries. eMaintenance has arrived, and is no longer "cutting edge"; rather, it is a necessity for any organization that manages their own facilities, asset owners that out-source their maintenance functions and facility managers, whose core business is to maintain to an ever increasing level of availability and efficiency.

iSCADA's unique ability to effectively consolidate data across multiple sites, integrate data across multiple systems, coupled with its managed services model makes it the platform of choice for implementing eMaintenance. It is the technology that drives facilities and asset management towards a new level of efficiency, availability and transparency.

About Devices World

Devices World is an MSC status company and developer of iSCADA – a patented Internet-based SCADA solution that utilizes the public Internet infrastructure as the data communication medium. It uniquely combines traditional SCADA technology with the open data communication protocols, services and data formats of the public Internet to deliver cost-effective and easy-to-use SCADA solutions. Our technology is aimed at bringing SCADA solutions to the masses. What was previously not economically feasible to be monitored by SCADA can now be monitored using iSCADA.

Delivered on a hosted, managed services model, iSCADA can be easily deployed from one site to thousands whilst maintaining high scalability and concurrency.

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