

Smart Battery Kit by IoT Gateway

Executive Summary

Many devices are wireless and mobile devices, In order to provide convenient connections and power supply. Learn how IoT methodologies can be used in conjunction with Smart Battery Kit to gather hospital medical field data and to publish the information to those who need it most.

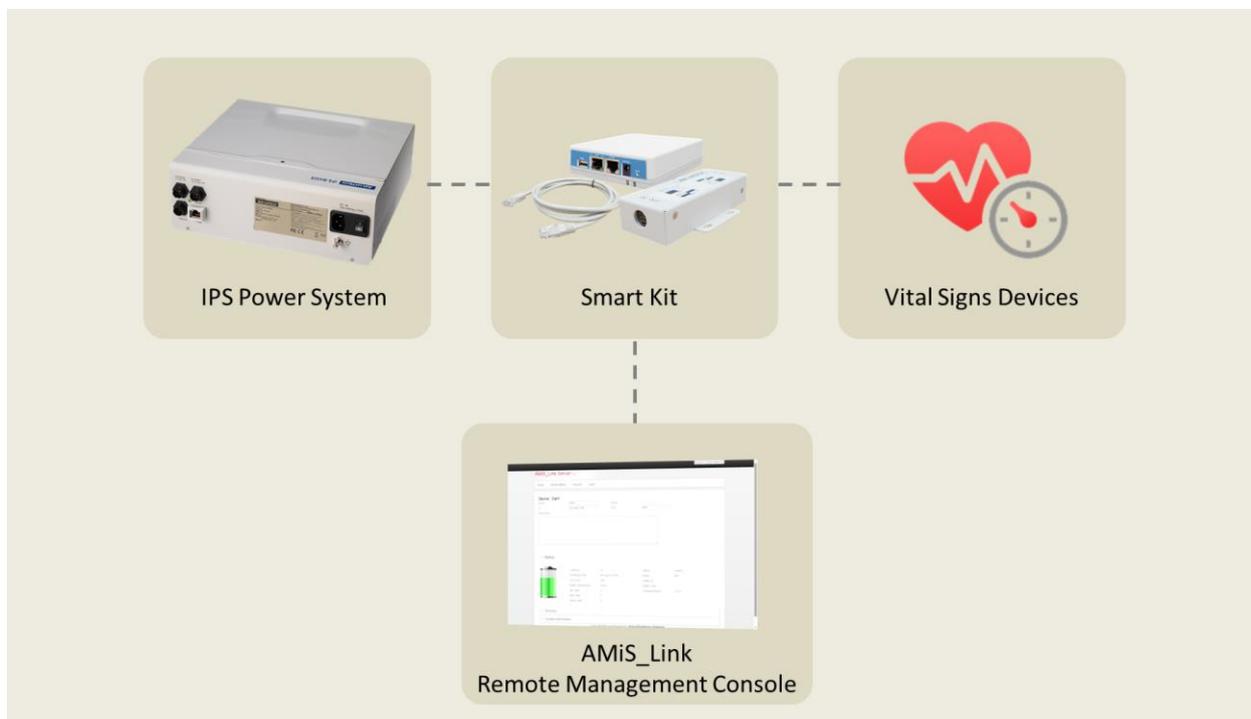


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Why Medical Field Needs IoT

In response to demographic aging brought about by long-term care needs, governments have to develop policies. Hoping to use Wi-Fi, Bluetooth, WWAN, GSP and RFID and other wireless technologies can architect mobile medical network; And in remote care and other issues fermentation, also contributed to the medical industry combination of things into the next stage of a new application.

Intelligent hospital can avoid unnecessary workload and avoid mistakes; it not only can significantly improve the sweat hospital phenomenon but also can through the innovative use of information and create more opportunities for medical illness can share the results, create a happy future moving.

Among the mobile information system need battery to achieve real free field mobile use. And the batteries management is very important, that because all the mobile information system need it to supply power for using. But the management is a very complex and time-consuming work. Smart battery kits with IoT can significantly improve this issue.

Battery Management

Right now, most of the hospitals are using medical cart as their nursing round main tool, the cart usually combine ear/forehead thermometer, sphygmomanometer, oximeter and other vital sign meter and a computer which connect to HIS (Hospital Information System). But all of these are need power supplied, if the power supply system fails then all the device on the cart will not be use. So, how to monitor and management power supply system will influence the patient care effectiveness.

Traditional Management

In traditional battery management, it needs health care personnel check the battery capacity at any time or the battery capacity will too low to shut down power system. On the other hand, when the power system shut down then health care personnel feedback to IT personnel to check the issue; And it will take much more time and human resource.

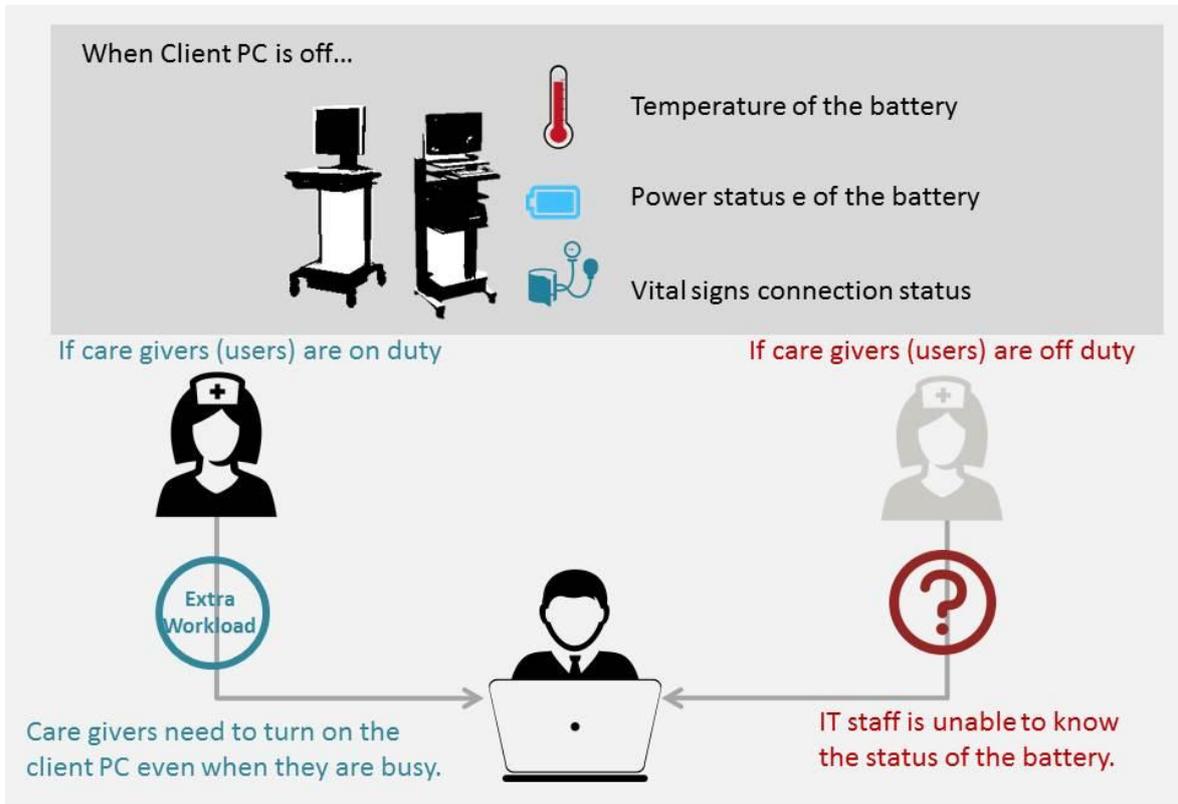


Fig.1: Traditional Condition

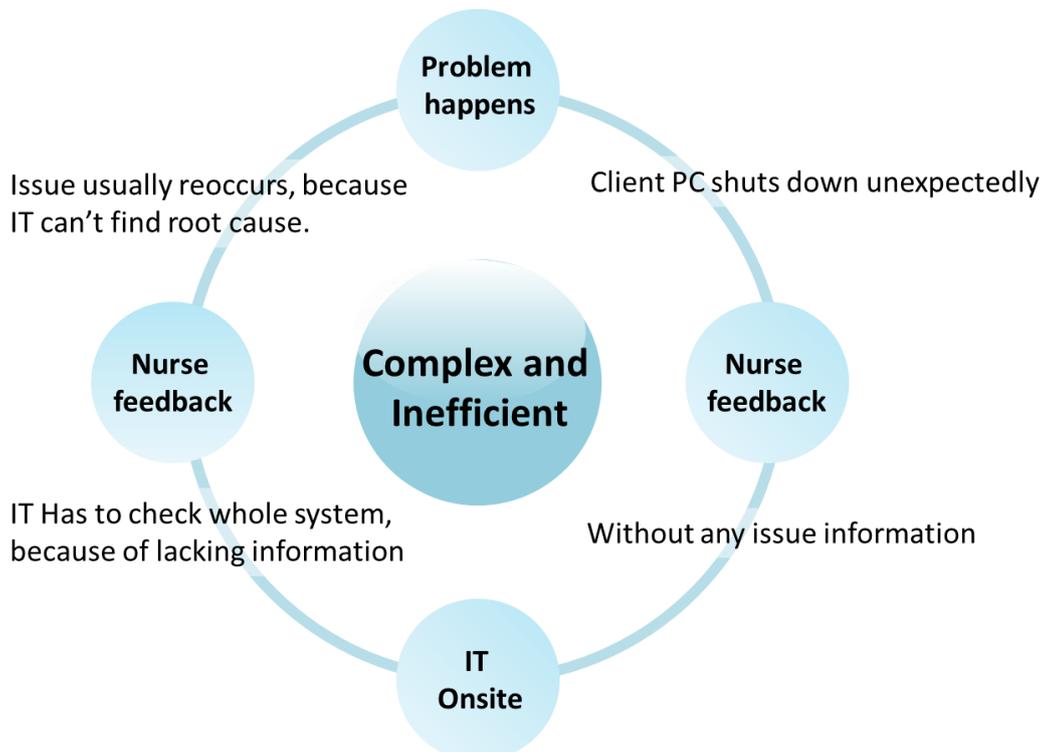


Fig.2: Problem cycle by traditional management

Management by AMiS_Link

The traditional management was passive management, which was very wasting time, human resources and low efficiency. In view of this, the Advantech develops a software application – AMiS_Link to management power system from passive to initiative. AMiS_Link can provide battery health information form client (mobile device) to server (IT), so the IT operator can monitor all of the mobile device power system status and give some remind to health care personnel and provide active maintenance opportunity.

AMiS_Link needs to be installed in a computer system to catch the battery health information and sends to server; AMiS_Link installation takes about 30 minute / per client.

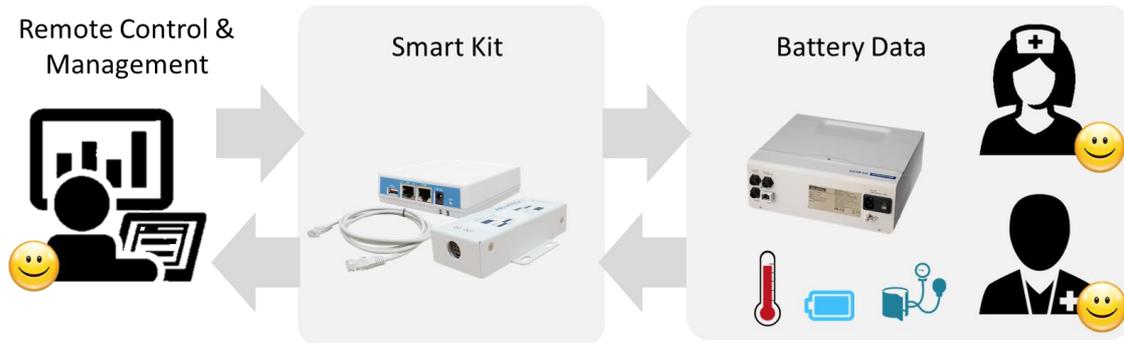


Fig.3: Smart Battery Management

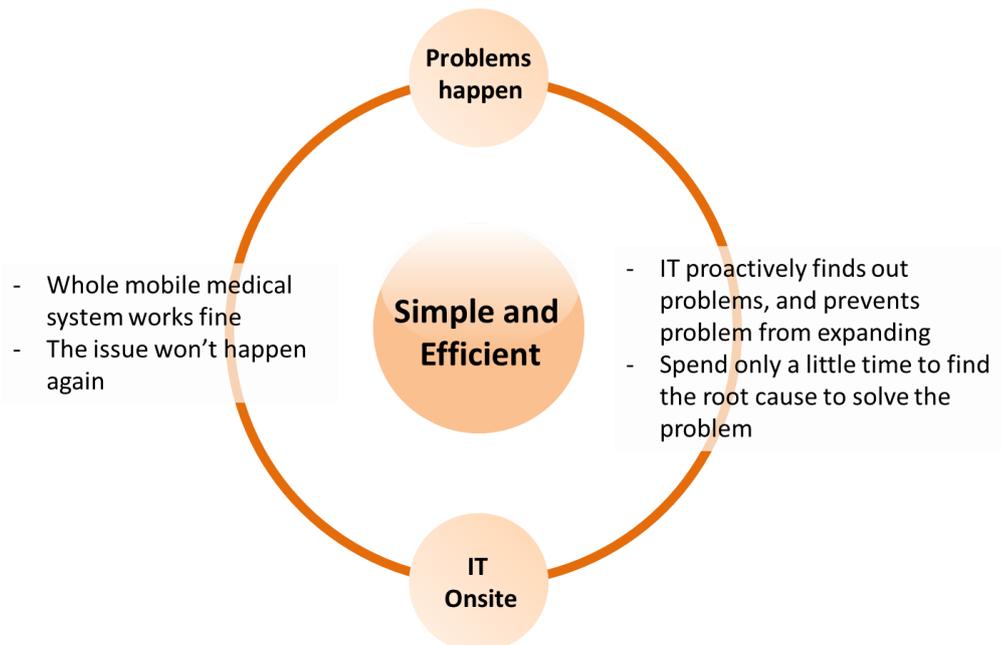


Fig.4: Problem solve chart by smart management

Management by Smart Battery Kit

Smart battery kit contain Advantech medical grade power system (IPS), AMiS_Link and IoT gateway. The Advantech medical grade power system use LiFePO4 as battery cell material, it provide longer life cycles, shorter recharge times, lower maintenance, lower toxicity, and 95% efficiency rating to transform chemical to electrical energy features. And this system has UL60601-1/EN60601-1, CE, FCC Class B, CCC certified.

AMiS_Link software application program can evaluate battery management from passive to initiative. And the Smart Battery Kit with IoT solution can transform the management to higher level. This kit can supply any mobile device power just like medical cart, vital sign devices, and mobile registration station. And the kit is constructed by a very simple architecture, only need an IoT gateway which has already programed by Advantech to connect the Advantech medical grade power system. According to the simple architecture, the Smart Battery Kit's maintenance is very easy, quick and convenience.

How is the Kit be Smart

Intelligent Remote Battery Management – AMiS_Link 3.0

AMiS_Link 3.0 has thin-client package to be easy install and use, and it has a very simplified installation procedure for server and client. The sever side can convenient grouping and setup. AMiS_Link can provide battery information, just like capacity, battery temperature, life cycle, battery cell voltage, in/output current and system temperature from client to server. And it is “No-Bother Design for Nurse”; just like real time battery and computer system health monitoring, attentively sends out alerts and with AMiS_Link 3.0, hospital IT professionals can easily manage each device.

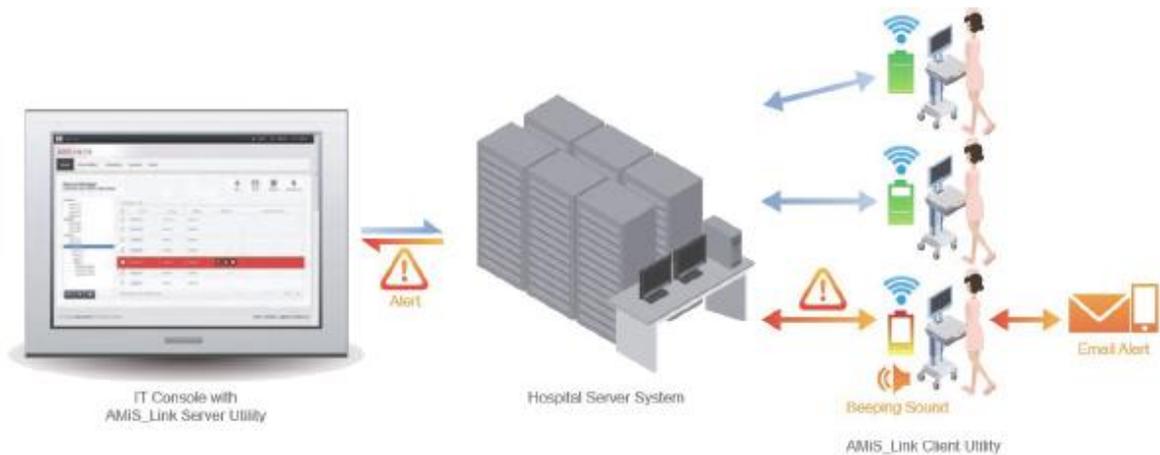


Fig.5: AMIS_Link structure

IoT Gateway Solution

The IoT-gateway can provide the function to replace the client-side computer. IoT-gateway can connect client-side IPS and server-side IT professionals via Wi-Fi when the client –side computer was shut down or even without computer. It connects to IPS via RS-232 and provides the wireless bridge for AMIS_Link data transmission form client to server.

The gateway has Wi-Fi and Bluetooth 4.0 function and it has 4G DDRIII SDRAM and can insert 8G (up to) micro SD card. The IoT gateway only consumes 5W (Max) power. And Wi-Fi can operate up to 20m range; Bluetooth can operate up to 10m range.

Smart Battery Kit Applications

Smart battery kit can combine medical equipment as intelligent medical equipment to enhance the quality of medical care benefits are quite obvious, such as wireless transmission of physiological measurement system. It can be linked at this stage most of the medical equipment, let the complex data record can easily correct transmission of data and dramatically to reduce medical person spend too much time to copying large data processing can be more accurate and easy completion nursing care work.



<p>Real-time Status Display</p> <ul style="list-style-type: none"> • Smart battery state diagram • IOT Information system 	<p>Graphical Management</p> <ul style="list-style-type: none"> • GUI management • Icon display
<p>Easy Group Management</p> <ul style="list-style-type: none"> • Group management • Log report 	<p>Quickly Device Paring</p> <ul style="list-style-type: none"> • Quickly device paring • High compatibility • High speed transmission

Fig.6: Smart Battery Kit vital sign application

For example, ECG monitor to the benefits derived increase the number of health care points is quite amazing, including day care, increased 500 points, ECG monitor one day increased 400 points, representing an increase of 2,628,600 points per year, and each bed hours save USD1,600 a year.



Fig.7: Vital sign system import Smart Battery Kit comparison

Smart Battery Kit IoT Solution Advantage

Smart Battery Kit evolved the medical mobile device power management history, it let IT person battery management from passive change to initiative; The kit can initiative provide battery health information to IT person, and IT person can analyze the battery status for reminding nurse to take the battery at low capacitive, if any problem happen IT can use the battery information log to find out root cause to solve issue; It breaks the limitation which is the battery management program needs to be installed in computer.

So, Smart Battery Kit can be used in any medical mobile device not limit on medical information cart. It not only can provide the power but also can transport the battery information to server and transport the sensors data to HIS. And customers do not need to annoy the client hardware compatibility, spends a lot of time installing client side battery management program, and easily to maintain the battery management system. Before the IoT solution import, IT person has to check all the program service setting and all the hardware communication to find out where is the problem happened. But after the IoT solution import, IT only needs to check the IoT gateway. So the maintenance time back and forth will save a lot of time. This kit can save 8 GB battery log data, even the client and server disconnect IT person still get the battery information to analyze the problem.

Smart Battery Kit can provide the roughly asset location by IP address, to IT do the asset management. IT person also can use the battery information as big data to know when is rush and when is idle, or what kind of equipment is more popular.

Location	Hospital/Clinic	Medical Center	Nursing Homes	Care Centers
Function	Mobile Power Bank	Quick Connection	System Smart Report	Smart Management
Feature	Milt-point Support	Real-time Monitor	Flexible Expansion	System Energy Saving
Easy Installation	★★★★★			

Table 1: Advantage list

	Traditional Management	AMIS_Link Management	Smart Battery Kit Management
Human resources	Most	Less	Minimum
Program installation time	No program	30 mins/PC	0 min/PC
Issue responsive time	1 hr	5 mins	5 mins
IT on-site repair time	2 hr/pcs	30 mins/pcs	30 mins/pcs
Maintain program time	No program	20 mins/PC	5 mins/PC
Data retention (client)	0	0	8000 records
Asset management support	Non	roughly location	roughly location
Devices supports	Minimum	Medium	Most of device

Table 2: Different battery management methods comparison