



# Leap Metro

Khoo Teck Puat (KTP) Hospital Singapore  
Case Study

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 majitek

## Singapore's most energy efficient hospital

Khoo Teck Puat (KTP) Hospital, a 550-bed new generation acute general care hospital located in the northern region of Singapore, is a product of the sustainable design movement. The 102,245-square-meter hospital is being designed as a “hassle-free” hospital — centered on patient needs and wants — and a model of energy efficient design.

In a country where temperatures hover around 86°F / 30°C year round, climate is a primary consideration in building design. Reducing temperatures and wringing humidity out of the hot, humid air can be cost-prohibitive in a country that imports almost 100 percent of its fuel required for energy production.

Careful building orientation, exterior detailing and interior planning can greatly reduce air conditioning needs and costs. At KTP Hospital, the goal is to reach a 50 percent reduction in energy use compared to existing Singapore hospitals, which currently use 3.26 MegaWattHours per month per bed on average.

In this 'eco-hospital', green design also marks a shift in medical attitude from treatment to prevention. A 'Healthy Living' zone — complete with a wellness center and rehabilitation suite — complements the hospital's connection to the outdoors.

Family and patient gathering lounges are open to the outdoors but under cover and shielded from the elements. In the patient rooms, a design premium is placed on orienting the rooms to maximize the island's natural breezes and move the air efficiently through the rooms. Ventilating grilles between six and 28 inches above the floor maximize the cross-ventilation. As Singapore discovered after the SARS epidemic in 2003, natural ventilation is also an effective way to control potentially deadly communicable diseases.

### Project Summary

Building Cost: S\$400 Million  
 Building Area: 102,245 Sqm  
 Hospital Beds: 550  
 Number of Building Systems: 25  
 Number of Points: 40,000  
 Completed: March 2010

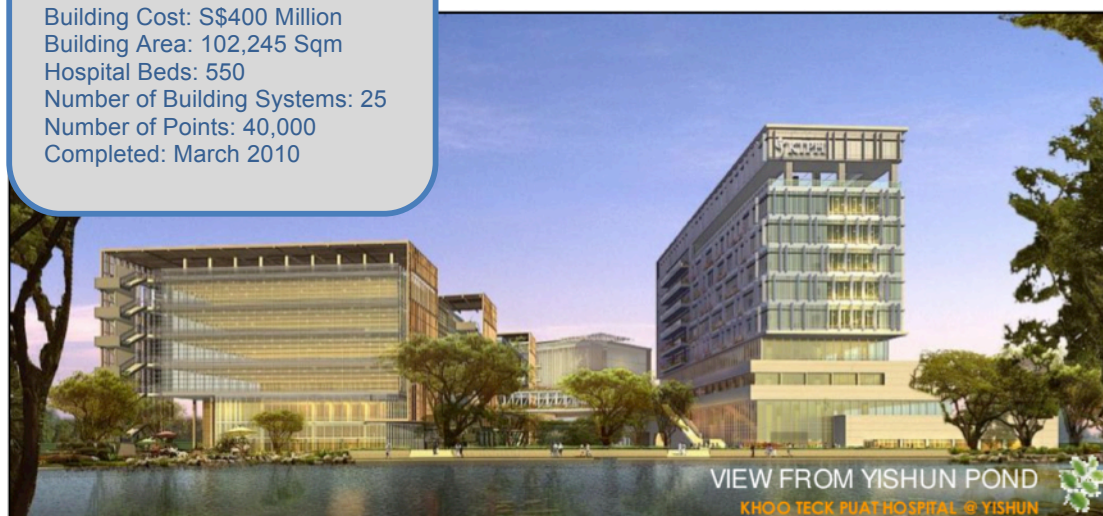


Image courtesy of KTP Hospital

## The Challenge

Integration and convergence of critical hospital systems will result in improved patient care and comfort, streamlined operations, increased productivity and reduced energy consumption. When completed in 2010, Khoo Teck Puat Hospital is expected to set a new healthcare standard for future hospitals in the region.

KTP Hospital will be the first in South East Asia to fully embrace “Connected Real Estate Technology” which digitally converges various building, information technology and voice/data subsystems from video surveillance, access control, nurse call system, data centre equipment, medical systems, environmental control to energy management systems onto a single Internet Protocol (‘IP’) Network.

In addition, the hospital design implemented a full spectrum of green initiatives to help create a clean, healthy, comfortable and energy-efficient environment. Eco-friendly technologies to be deployed include germicidal UVC emitters for the air-conditioning system to eliminate bacteria, viruses and mould; Titanium Dioxide for removal of odours and bio-aerosol; green fuel cell back-up power and rain sensors for weather-responsive controls; and other innovations.

# 25

Building Subsystems

# 40,000

Intelligent Building Points

## The Leap Metro Solution

Leap Metro was selected for this project for its ability to aggregate data in real time from various hospital subsystems irrespective of vendor products or communication protocols. The product’s unique cloud computing architecture was ideally suited to managing the extremely high number of intelligent points and the requirement for redundancy for all business critical applications.

Leap Metro provides a fully integrated suite of building management and facility maintenance applications ensuring that the building itself can issue alarms enabling maintenance staff to rectify issues before patients and staff are even aware of them. This integrated approach helps KTP Hospital to improve patient care and comfort, streamline operations, increase productivity and reduce energy consumption. Patient convenience will be a key priority in the hospital where IP devices, located next to a patient’s bed, may double up as a point of care device for the control of lighting and air-conditioning, ordering meals and receiving signals from biomedical monitoring devices.



Image courtesy of KTP Hospital

# Environmental Optimization

Local weather patterns, temperature, shading, humidity and building airflow provide variables that affect human comfort.

Detailed analysis of the local environment and the overall building design provided an array of sophisticated rules that defined the optimal settings for human comfort. By implementing these rules, as automated policies within Leap Metro, building systems will monitor data from sensors inside and outside the building envelope and constantly adjust to achieve an optimal set point.

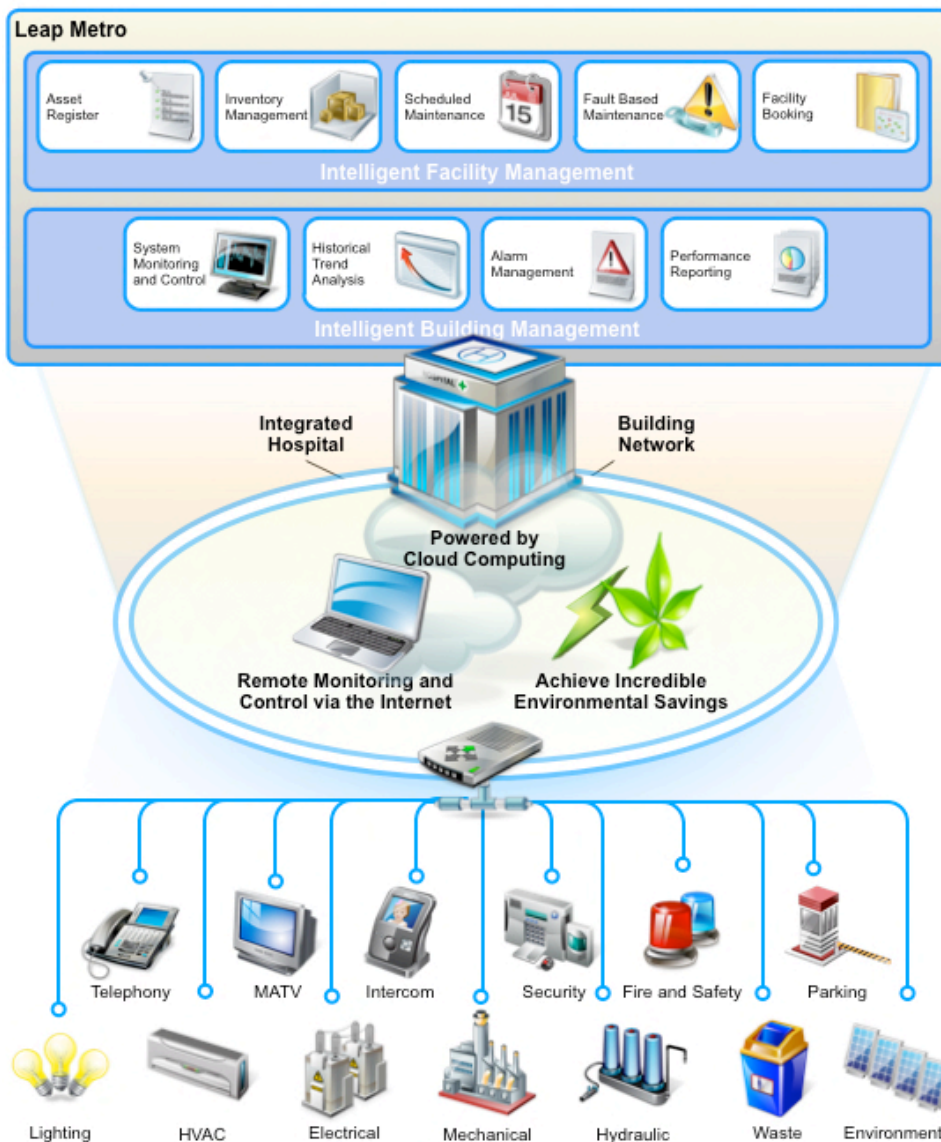
With appropriate infrastructure in place, Leap Metro enables energy savings of up to 30% compared to standard buildings whose systems remain at a constant setting oblivious to their surroundings.

Singapore BCA  
Platinum Green Mark  
Rating



Energy Savings of  
30%

In recognition for its adoption of innovative sustainable green technologies KTP Hospital was awarded a Green Mark Platinum Rating in 2009 the most prestigious award of its kind in Singapore.



# Key Business Benefits

## Open Systems

### **Integrate systems from any vendor and any technology**

Leap Metro provides a unifying monitoring, reporting and control layer over the top of individual hardware control systems. The benefits to this approach are twofold. First it provides an umbrella layer for application of uniform automation policies, alarm management and reporting that does not interfere with the operation of individual localized embedded control systems. Second it means that data from multiple vendors can be integrated within one automation system and automation policies can be applied between or across multiple sub-systems. This means that you as the customer have ultimate choice and flexibility with no vendor lock in.

## Scalable

### **Manage hundreds of thousands of intelligent points**

Unlike any other building management or facilities management product in the market Leap Metro is designed to leverage cloud-computing economics. Built from the ground up using the latest technology the Leap Service Engine enables applications to utilize capacity from one or more low cost computer servers in a cloud. Applications running on the Leap Service Engine can linearly scale their processing capability simply by adding more servers to their cloud. If any server fails the Service Engine dynamically reallocates processing load to other servers within the cloud providing critical system reliability without the need for expensive dedicated hardware. Leap Metro harnesses the power of this engine enabling real time monitoring and control at massive scale without the cost of dedicated server hardware.

## Internet Ready

### **Accessible anywhere using a standard web browser**

Leap Metro is designed specifically as an Internet based software application. Using contemporary web software architectures, Leap Metro can be used by thousands of concurrent users with nothing more required than a standard web browser and an Internet connection. This removes costs of dedicated monitoring hardware and means your staff can securely access critical information at any time from any Internet ready device.

## Improve Energy Efficiency

### **Enable building systems to optimize themselves rather than wait for people to do it**

Leap Metro connects building systems to each other and to the surrounding environment. With information available from all aspects of building operation policies can be set such that building systems will self regulate and optimize their operation based on current conditions rather than running continuously at one setting all the time. By enabling your building to make intelligent decisions about settings key subsystems Leap Metro can assist to reduce energy consumption by an average of 30%.

## Lower Cost of Operations

### **More automation, fewer people, means less mistakes and less cost**

Leap Metro integrates systems and processes at both a building system level as well as at the facility maintenance operation level. Its powerful inbuilt workflow designer empowers you to design automated policies that remove the need for human supervision and decision making at every step of operation and maintenance processes. Your building can now intelligently optimize its performance and inform your staff when and if it needs specialist intervention or repair. This means your building can run better, using less people, now that is truly a leap forward in real estate operations.

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