

CASE STUDY

LINUX SYSTEM INTEGRATION

featured
Drainage Service Department

ACISE CASE STUDY

Company Background

The main task of the Drainage Service Department is to provide the community with a high standard of protection against flooding and a good quality sewage system to safeguard public health.

Business Objective and Motivation of Implementing Linux Solutions

1. As Linux is a stable operation system, it is suitable for running as an equipment monitoring and surveillance system.
2. Plenty of cost saving for running Linux operation system.

Deployment Scale and Scope

Country of deployment : HK
Number of IT users : 10
Total number of servers : 6
Number of servers running Linux : 6

Implementation Strategy

For the small-scale remote monitoring systems set up at the Wanchai West Sewage Screening Plant and Tung Tau Sewage Pumping Station, Linux platform has been adopted as the operating system and communication backbone. Figure 1 is a block diagram showing the configuration of the remote monitoring systems DSD has set up using Linux platform.

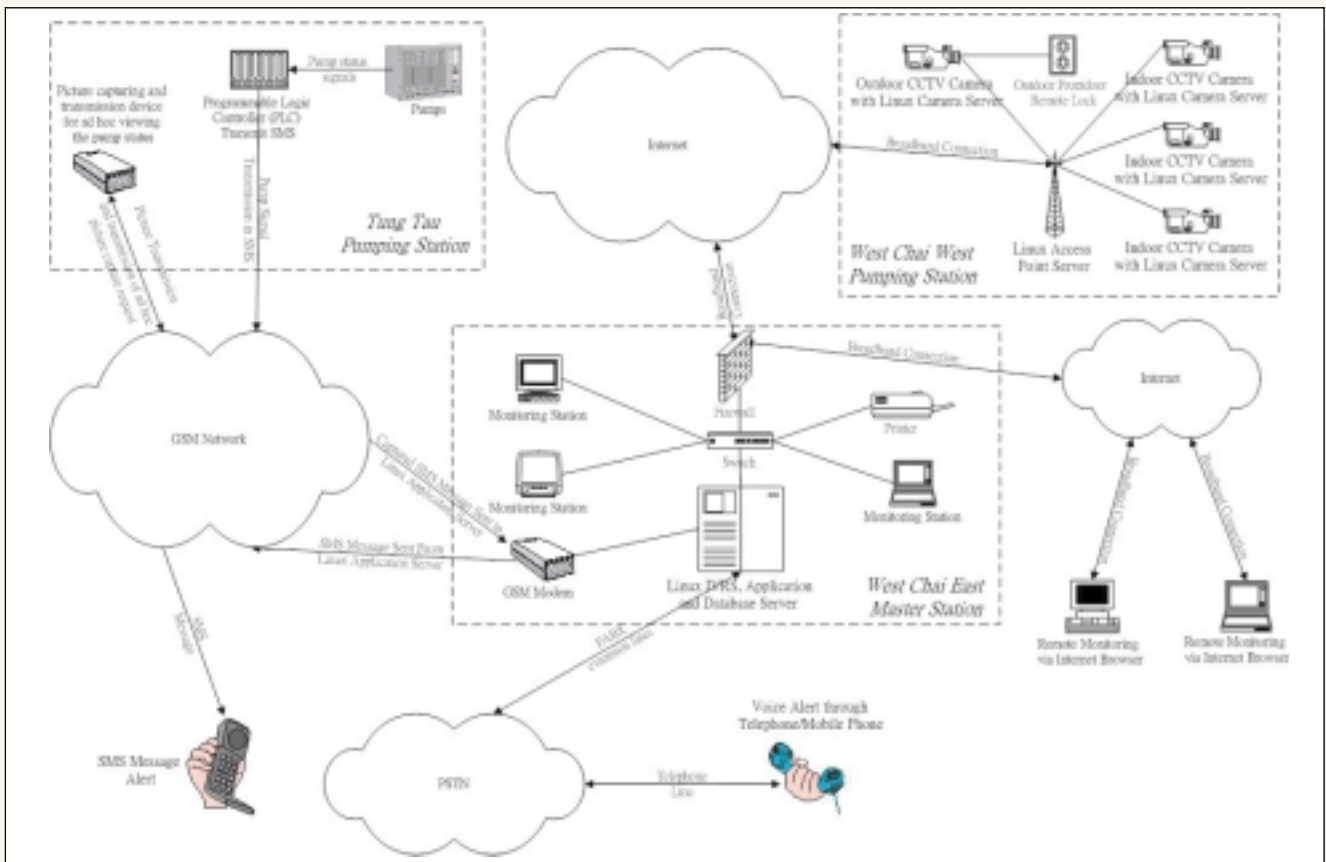
Tung Tau Sewage Pumping Station is located within Tung Tau Prison and is unmanned. For security and operational reasons, a remote monitoring system has been set up for the pumping station. The remote monitoring system comprises closed circuit televisions (CCTVs) and programmable logic controllers (PLCs). While CCTVs are installed for capturing real time images of the sewage pumping station, PLCs are also installed for processing the equipment signals captured. The images and equipment signals captured are transmitted via Global System for Mobile Communication (GSM) to an application and database server in the Wan Chai East Sewage Screening Plant, hereinafter referred to as the Server. This Server runs on Linux platform. Information and data in the Server can be accessed by authorized personnel from desktop computers in the Wan Chai East Sewage Screening Plant or from any desktop computers via the Internet. To cut down the cost of wireless transmission, equipment signals and images captured are sent to the Server as short messaging signals (SMS). To ensure staff in charge of the Tung Tau Sewage Pumping Station can attend to an equipment fault within the pumping station in the shortest possible time, an alarm-messaging feature has also been added to the remote monitoring system. All equipment signals that have been classified as alarms are sent as SMS to the pre-selected mobile phone numbers via a system known as Interactive Voice Response System (IVRS).

Similar to Tung Tau Sewage Pumping Station, the Wan Chai West Sewage Screening Plant is also unmanned. For security reasons, CCTVs are installed at strategic locations within the sewage screening plant. The video images captured by each CCTV are processed by its server and then transmitted to a wireless access point server for further processing and onward transmission to the Wan Chai East Sewage Screening Plant via a broadband connection. Both the CCTV servers and the access point server are Linux based. Other than CCTVs, the remote monitoring system also comprises a control feature for the remote locking and unlocking of the front door of the sewage screening plant.

This solution is honored the Merit Award under Infrastructure Building and Communication Application Category of the Linux Business Adoption Award 2003.



Below is the block diagram of DSD's Remote Monitoring Systems for Tung Tau Sewage Pumping Station and Wan Chai West Sewage Screening Plant:



Technology and Methodology Employed

Global System for Mobile Communication (GSM), Short Message Signal (SMS), Programmable Logic Controller (PLC), Interactive Voice Response System (IVRS), TCP/IP Protocol, Tomcat, Java Development Kits (JDK), J2SE and Apache Red Hat 7.0.

Innovative Areas

For Tung Tau Sewage Pumping Station the innovative areas are as follows:

- break through traditional limitations of telephone lines and broadband access within Tung Tau Prison by using GSM;
- cut down on the cost of wireless communication by transmitting equipment signals and images captured by CCTVs as SMS;
- monitor pumping station equipment status via the Internet;
- send SMS to pre-selected mobile phone numbers via the IVRS.

For Wan Chai West Sewage Screening Plant, the innovative areas are as follows:

- minimize the cost of CCTV LAN wiring in Wan Chai West Sewage Screening Plant by using a wireless Linux Access Point Server;
- monitor screening plant equipment status via the Internet;
- control equipment operation via the Internet.

Customer's Comments:

The remote monitoring systems set up at Tung Tau Sewage Screening Plant and Wan Chai West Sewage Screening Plant by Acise Technology Ltd. and MajorLink Communications Ltd. respectively are both innovative and effective. Both systems run on Linux and the systems have been stable and reliable so far.



Cost Benefit Analysis - Short Term and 5-year Total Cost of Ownership (TCO) Analysis

Difference in Capital Costs between the existing Linux Operation System and a Window Operating System:

	Capital Cost of each of the Existing Remote Monitoring System (Linux Platform)	Estimated Capital Cost of each of the Remote Monitoring System using Window Platform
Access Point Server included Software & Hardware	HK\$3,000	WinGate Pro 5.x 6 User, Window 2000 Server OEM with hardware (HK\$17,000)
Camera Server included Software & Hardware	HK\$10,000	Camera Server software, Window 2000 Server, OEM with hardware (HK\$28,000)
Interactive Voice Response System included Software & Hardware	HK\$37,000 included software programming (developed by Intel Dialogic System Release) and hardware	Around HK\$110,000 included software (developed by Intel Dialogic System Release), Windows 2000 server OEM with hardware and programming
Wiring Cost	HK\$0	HK\$45,000
Total Cost	HK\$50,000	HK\$200,000

Total capital cost difference is HK\$150,000 (300% difference).

Difference in Operation and Maintenance Costs between the existing Linux Operating System and a Window Operating System:

	Operation and Maintenance (O&M) Costs of each of the Existing Remote Monitoring System (Linux Platform)	Estimated Operation and Maintenance (O&M) Costs of each of the Remote Monitoring System using Window Platform
Total O&M Cost per annum	HK\$15,000	HK\$15,000
Total O&M Cost for 5-year	HK\$75,000	HK\$75,000

Total O&M cost difference is HK\$0.

The difference in 5-year TCO between a Linux and a Window operating system is HK\$150,000.

ACISE TECHNOLOGY LIMITED

HEADQUARTERS

Telephone: 852. 2856 3710

Fax: 852. 2856 1707

Email: info@acise.com

Website: www.acise.com

Address: Room 808, 8/F.,

Metro Centre II,

21 Lam Hing Street,

Kowloon Bay,

Hong Kong