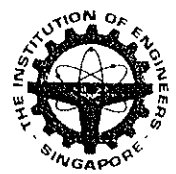
SEMINAR ON

IMPACT OF IT ON MODERN BUILDING DESIGN

JOINTLY ORGANISED BY



Computer Engineering & IT Committee



REDAS

SEMINAR
ON

Impact of IT on Modern Building Design

25 October 2002, Friday
Marina Mandarin Hotel

Programme

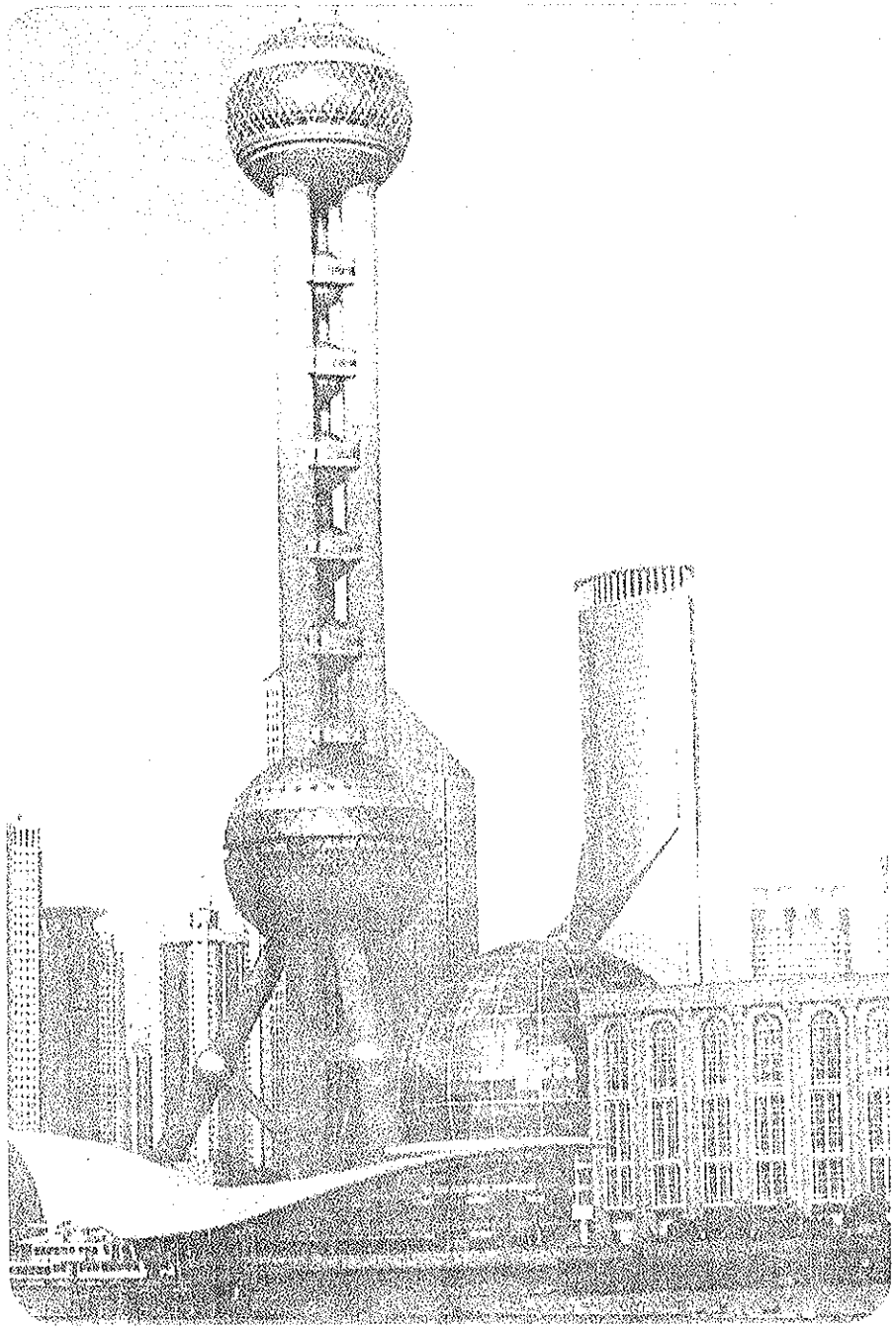
2.00pm	**Registration**
2.20pm	**Opening Address** **Er. Simon Wee Hian Wen** Chairman of Computer Engineering & IT Committee, IES
2.30pm	**Intelligent Building – Blending IT Applications with Brick and Mortar** ➢ The components of an Intelligent Building Solution ➢ Examples of Intelligent Building Applications ➢ Benefits of Intelligent Applications to the Building Management ➢ HP services for Intelligent Building Solution ***Mr Lee Ming Kai*** *Network Consultant* *Network Services, HP services*
3.00pm	**Intelligent Building Management System on Modern Buildings** ➢ Showcase of Project ➢ Overview of System Integration at via Information Technology which includes ▪ LON Technology ▪ Facilities Management ***Dr David Ong Liang Eng*** *Deputy Chief Operating Officer (COO)* *CNA Engineer Pte Ltd (Singapore)*
3.30pm	**Break**
4.00pm	**Trends in Lighting Control and Building Management Systems** ***Mr Bernard Emby*** *Managing Director* *Clipsal Integrated Systems (M) Sdn Bhd*
4.30pm	**Applications and Implications of IT on Facilities Management** ***Mr Wong Yew Heng*** *Chief Operating Officer* *Colliers International Asset Management*
5.00pm	**Question and Answer Session**
5.30pm	**END**

Jointly Organised by

REDAS

INTELLIGENT BUILDING – BLENDING IT APPLICATIONS WITH BRICK AND MORTAR

Mr. Lee Ming Kai
Network Consultant
Network Services, HP Services



Blending IT with Brick and Mortar

Hewlett Packard

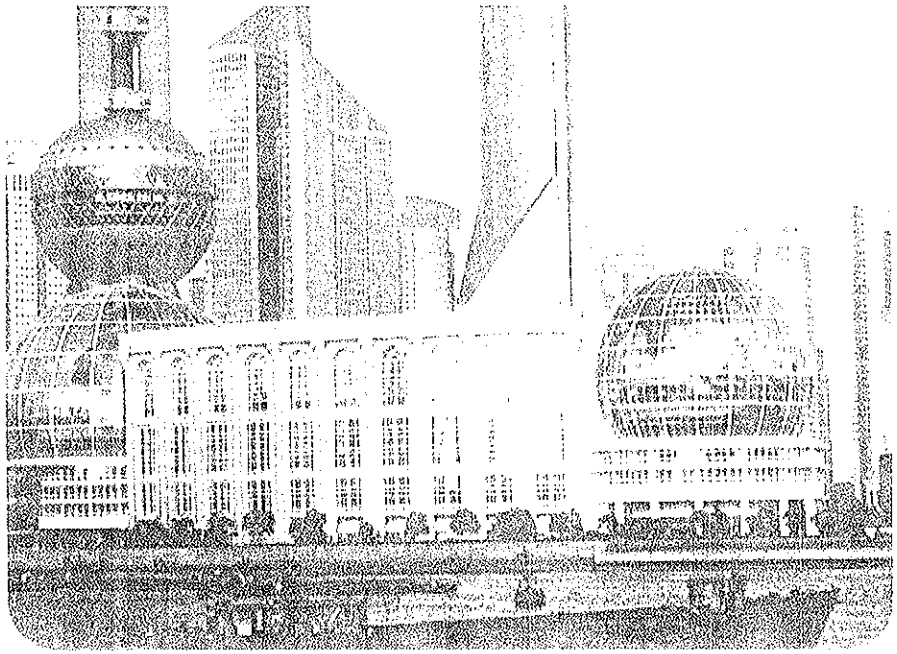
Network Services

Lee Ming Kai
Network Consultant

agenda

- market trends
- components of an Intelligent Building Solution
- Intelligent Building Applications for offices and homes
- Benefits of Intelligent Applications
- HP services for Intelligent Building Solution

Market Trends



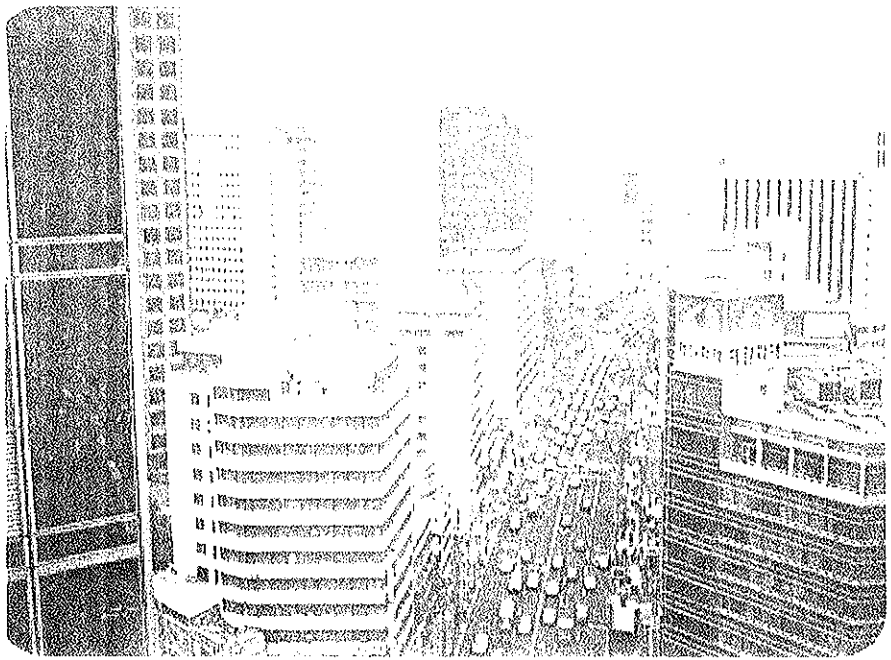
- Traditional building intelligent service is no longer enough
- Internet is the ubiquitous medium, it changes your environment and life
- Information Technology demographics increasing
- End users demands value-added services and access to these services anywhere, anytime
- There's a revolution in Access devices in terms of mobility - not only PC or servers, everything can be networked

Asia Pacific Technology Demographics

2000 Demographics	Telephone Lines In Use (K)	People/ Telephone Line	Internet Users (K)	Internet Users, % Population	Households w/ PCs
Australia	9,906	1.93	9,859	51.7%	39.0%
China	132,634	9.62	13,720	1.1%	14.3%
Hong Kong	4,024	1.72	3,396	49.0%	25.8%
India	32,078	31.42	4,979	0.5%	0.7%
Indonesia	6,566	32.05	1,371	0.7%	0.6%
Japan	73,351	1.73	37,453	29.5%	35.1%
Malaysia	4,493	4.96	1,968	8.8%	24.5%
New Zealand	1,906	2.02	867	22.5%	41.3%
Philippines	3,314	23.03	725	1.0%	2.1%
Singapore	1,990	1.63	1,314	40.5%	56.0%
South Korea	20,582	2.30	16,495	34.9%	27.0%
Taiwan	12,586	1.77	6,148	27.6%	31.2%
Thailand	5,372	11.44	1,003	1.6%	7.3%
Vietnam	2,423	33.16	148	0.2%	0.5%

Source: In-Stat/MDR, 04/02

what is an Intelligent environment ?



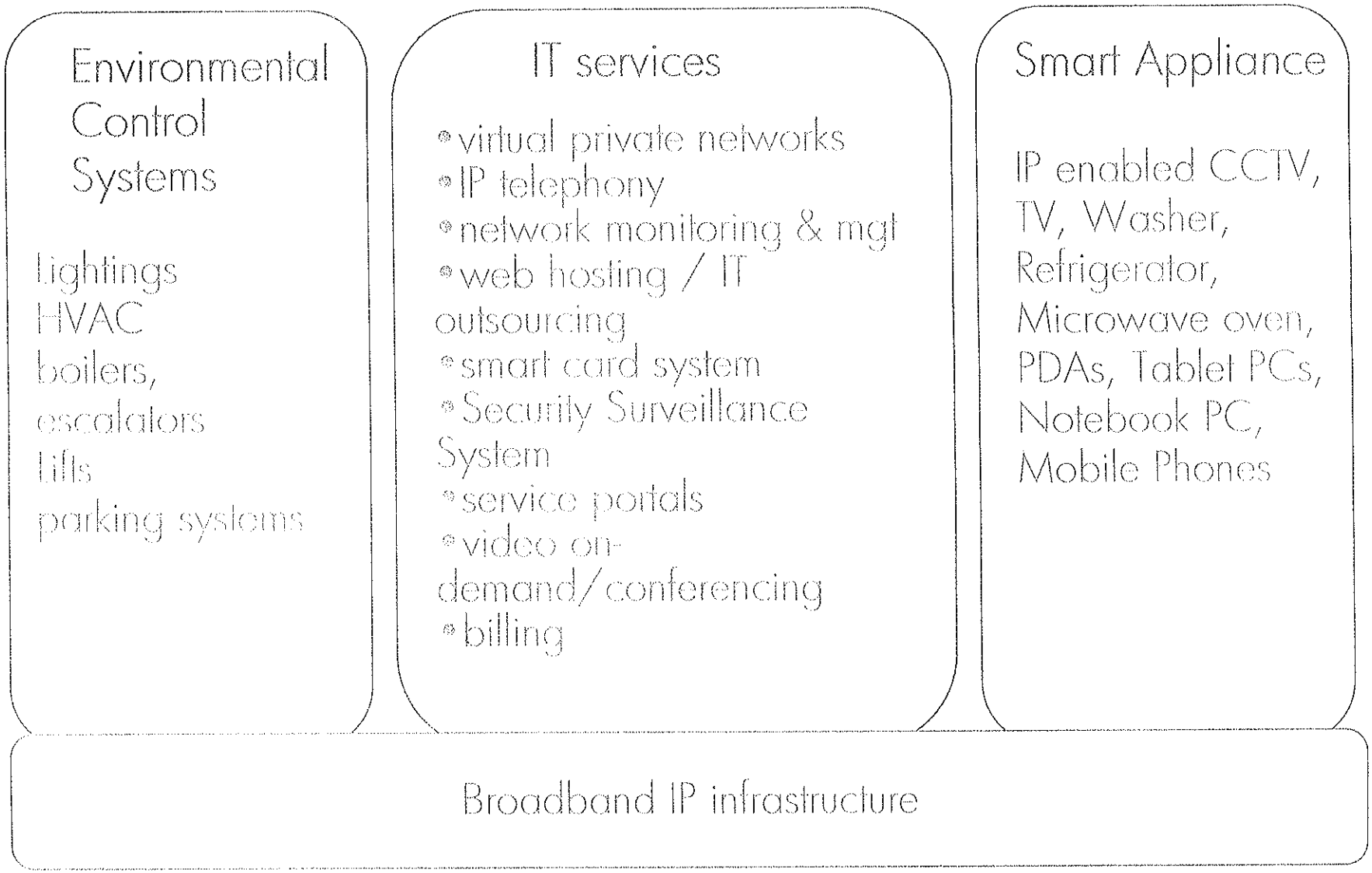
- a multi function area that offers different intelligent services
- everything is connected and controllable for human life, either for business or entertainment
- enable property owners to *transform* their assets and *move up the value chain*
- a open standard infrastructure that allows future plug-ins
- accessibility anytime, anywhere

Why blend IT into business?

The Role of Information Technology

- Reach – extension of services to wider audiences, make services available anytime, anywhere
- Innovate – Use of IT as an innovation tool to create new services with WOW appeal
- Control – better control and management
- Efficiency – Looking at IT to automate and cut costs through consolidation and convergence

components of i-building solutions



intelligent Building applications

Building Management Solutions

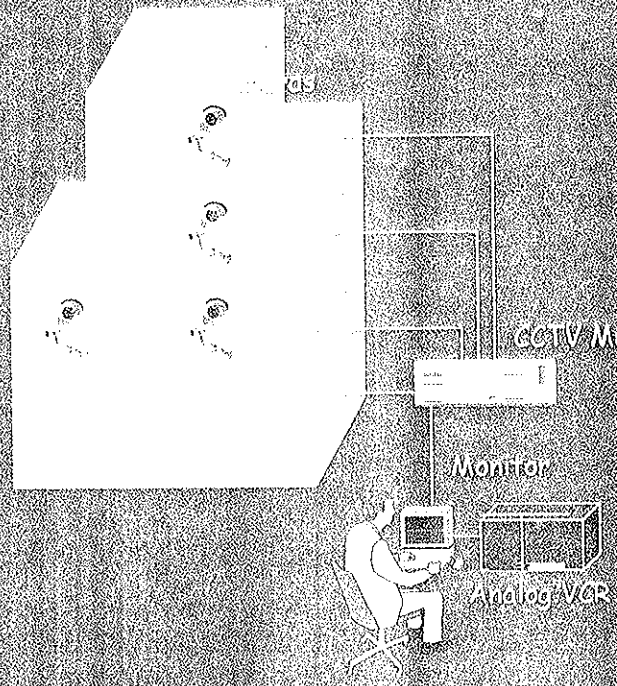


Surveillance System

Customer Self Help

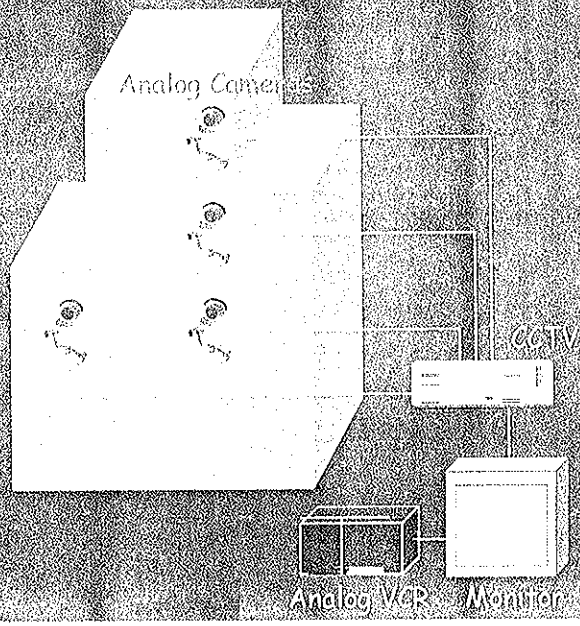
Centralized Resource Mgt & Booking

Traditional CCTV System

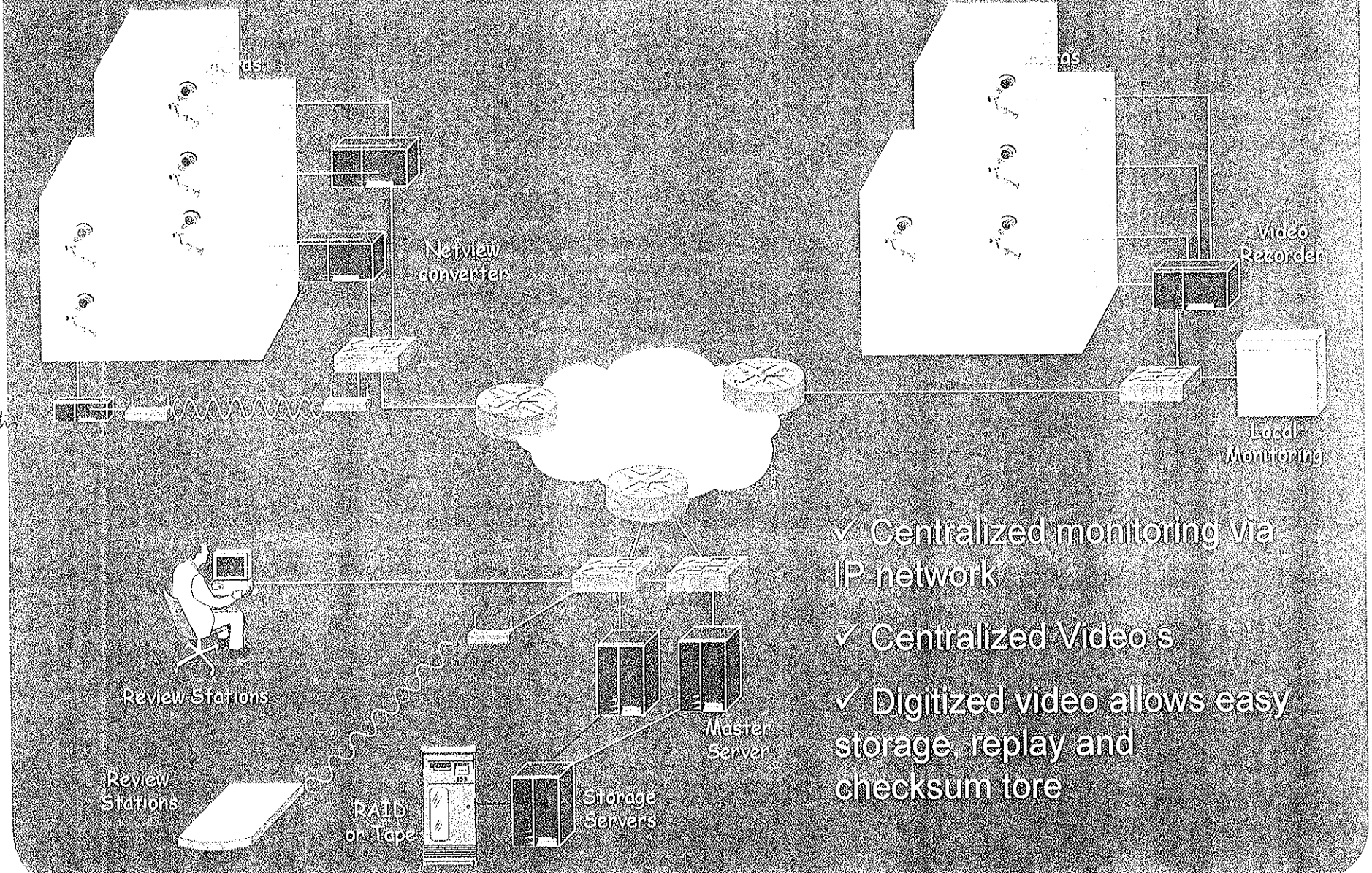


- ✓ Standalone systems with directly attached monitor(s) and VCR - Analog
- ✓ Tape changes are manual – prone to errors resulting in erased or overwritten tapes
- ✓ Require full time staff manning monitors for alert
- ✓ Useful mainly for post-mortem of intrusions or breaches to security

- ✓ Every new installation will require a separate group of security professionals for monitoring
- ✓ Economies of scale through shared resources and Centralized monitoring not possible



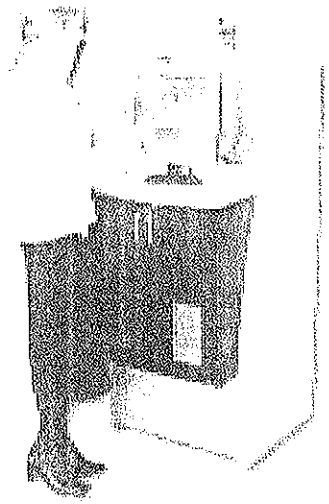
The IP Surveillance Solution



- ✓ Centralized monitoring via IP network
- ✓ Centralized Video s
- ✓ Digitized video allows easy storage, replay and checksum tore

Virtual Receptionist

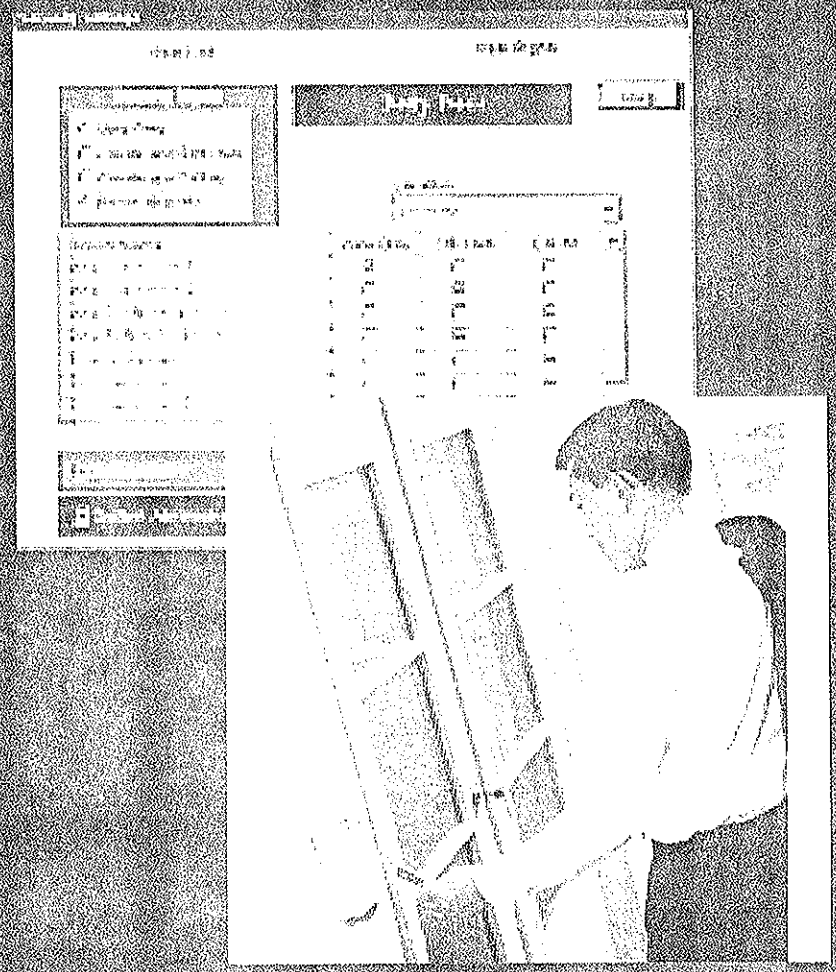
- An integrated visitor management system
- Allows visitor self-help
- Integrating control/automation systems with IP applications
- Empowering the customer and corporate users



integrate with smart cards

Centralized Resource Booking

- Room booked through the online resource booking portal
- Door is locked with smart card access
- Someone with smart card, but did not book the room tried to access the room, but room remains locked
- Only the person that booked that room at that particular time is allowed to access the room
- Lights auto-on when room occupied



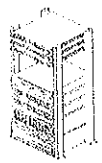
Smart Home Solutions

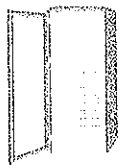


Environment Control

Equipment Control

Network Infrastructure







Gateway

Management Workstation



Internet



Remote Administration

Building Management System













Home Appliances



Web based interface allows control of home appliances.

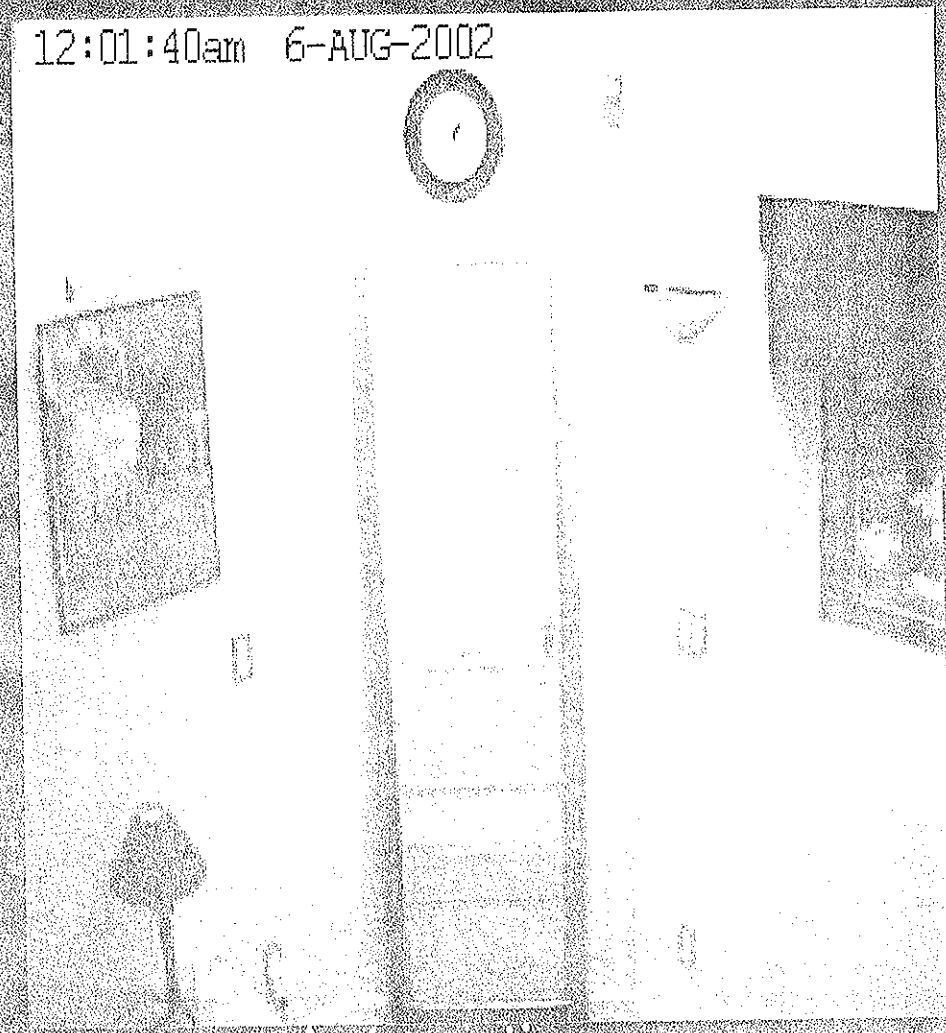
Use PDA to control lights, curtains etc.

Residential Gateway

universal remote control

Smart Environmental control

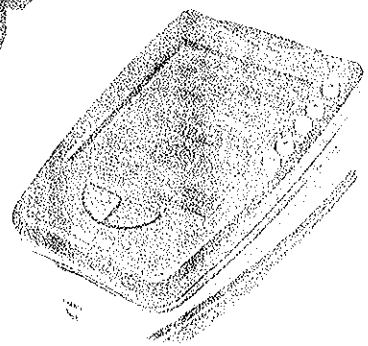
- Sensor activated
  - Light on/off
  - Blinds/curtain control
- Internet enabled controls (through web browser)
  - Light on/off
  - Light – dimmer functions
  - Blinds/curtains control
  - Door lock/unlock
  - Temperature control
- Mood Control
  - Preset combinations

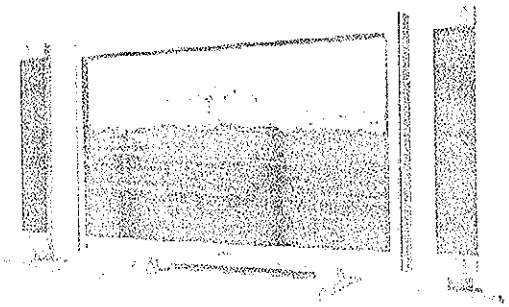


Automation

Remote Control

- Universal remote controllers wirelessly, at the touch of a button, the patient sets the mood for his/her room
- the curtains close
- the lights dim to the appropriate level
- the tv switches on
- the sound system sets itself to the correct movie mode







Infotainment for Service Apartments & Hotels



Service Portal

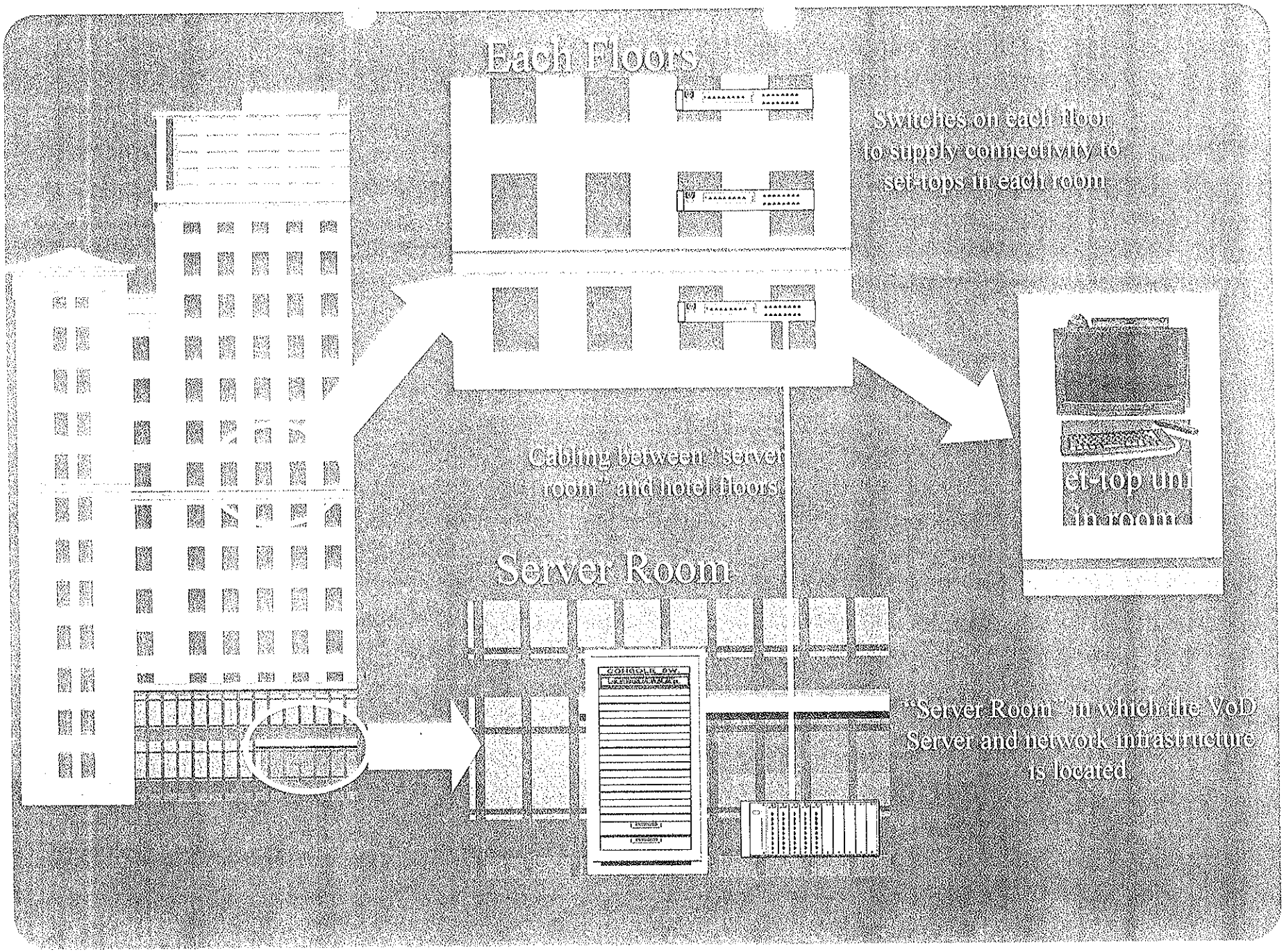
- community service
- facility management

Video on Demand

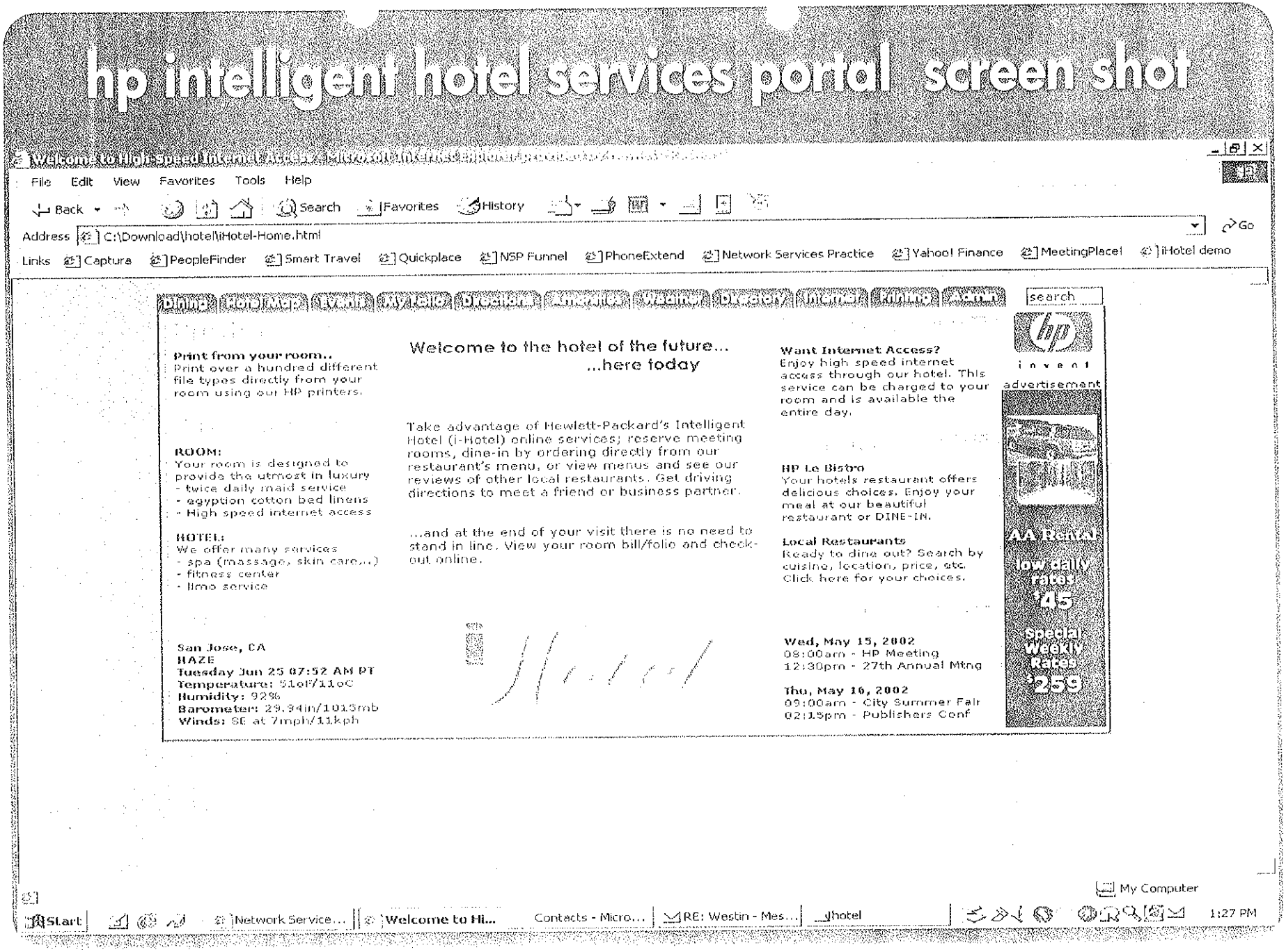
- digitized video
- run on data network

Application Server

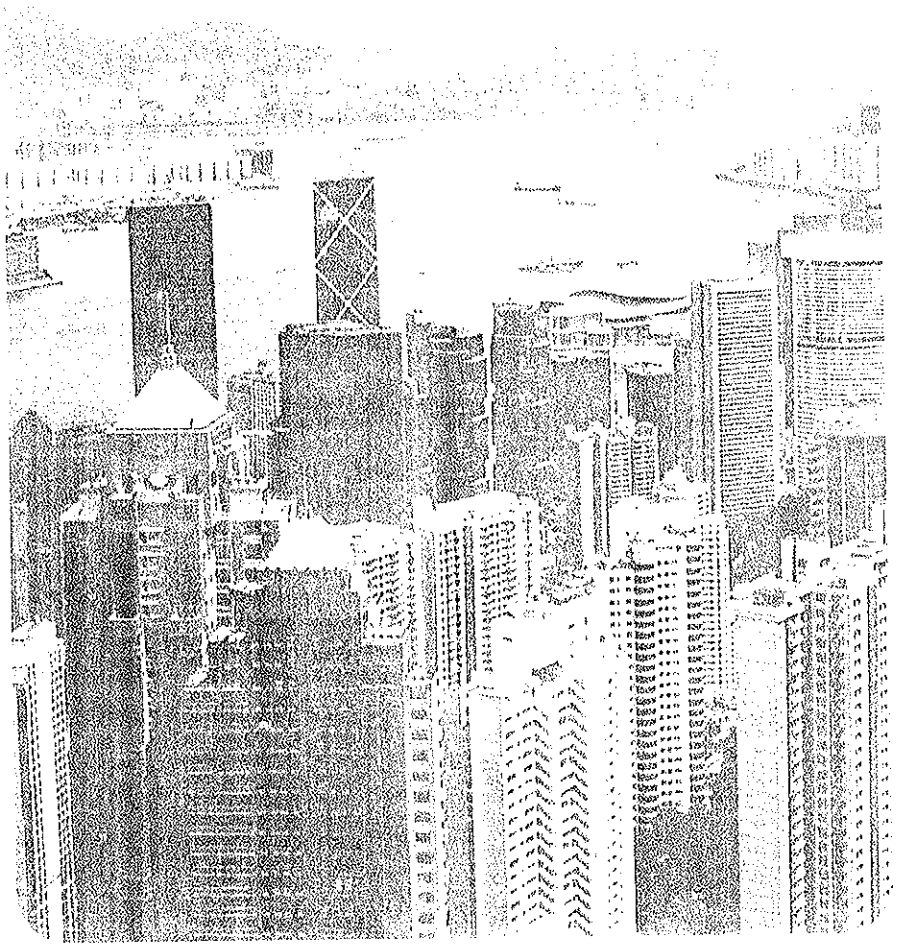
- online game


Each Floors
Switches on each floor
to supply connectivity to
set-tops in each room
Cabling between "server
room" and hotel floors
Server Room
"Server Room" in which the VoD
Server and network infrastructure
is located

hp intelligent hotel services portal screen shot



hp hotel printing



providing business travelers with convenient, high-quality printing capability from their laptop

video-on-demand



enhanced entertainment

- support for iTV functionality
- support for HDTV quality
- event-driven PPV
- PVR capability for FTG
- centralized video serving
- wider range of video products

benefits to Building Owners and Management

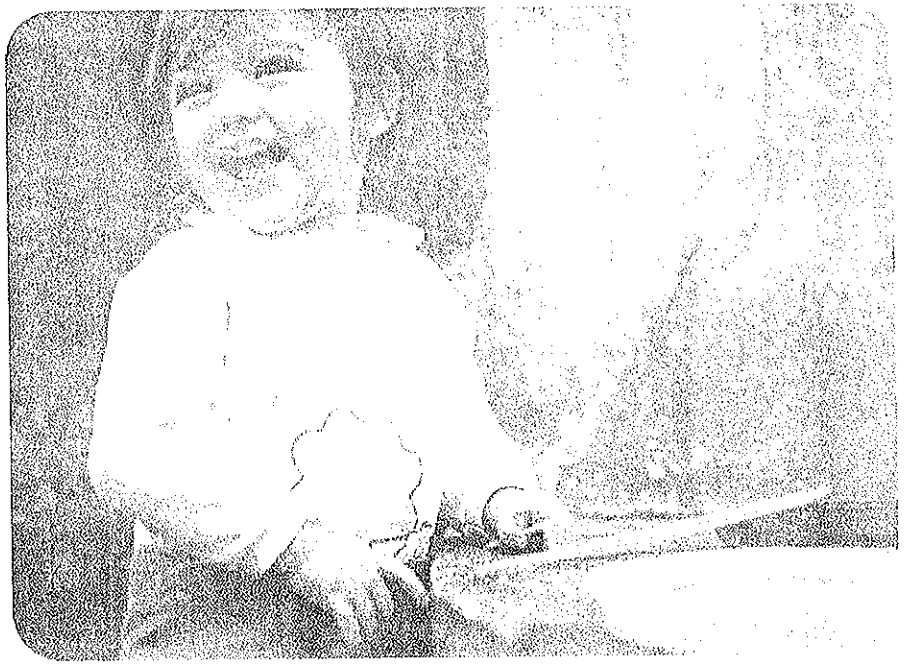
benefits

tenants/guests/home owners

- cost-effective access to scalable, Enterprise-level IT services
- stay "connected" to friends, family, and colleagues at all times
- online access to information and service provisioning
- improved communications and collaboration
- convenience

property owners/managers

- attract and retain tenants, guests, students, and merchants
- generate new revenue streams
- establish competitive differentiation
- scalable solutions that grow with business needs
- track demographics and customer behavior to improve property mktg



benefits



- ✓ Maintaining of optimum temperature – increase comfort for occupants
- ✓ Saves energy - lower utilities costs
- ✓ Reduces operational, maintenance & manpower cost
- ✓ Scales down the human error component
- ✓ Efficient security

HP Services

- enabling intelligent building solutions

performance

- multiple technologies to meet your requirement
- Gigabits backbone support multimedia application

reliability

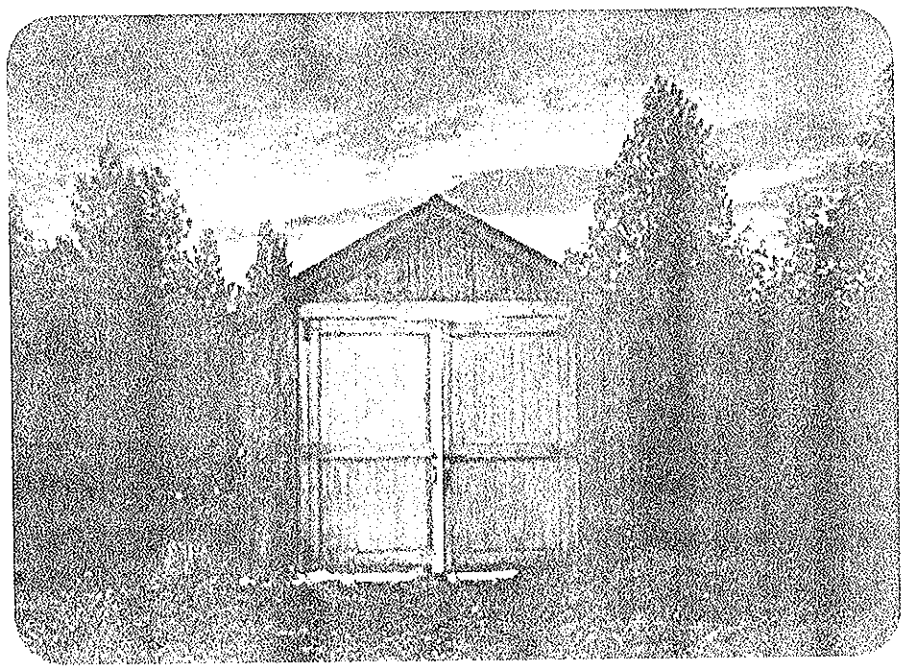
- redundant design reduce downtime
- hot swappable module guarantee uptime

scalability

- easily add, move and change of capacity
- protect your investment

innovation workshops

- Conduct workshops targeted at creation of innovative, new ideas
- Maps the technology available to implement and commission these new services



research and development in new technologies

- Cooltown
- Cooltown technologies

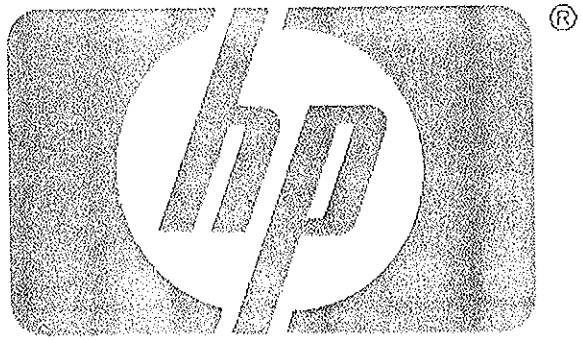
Complete suite of IT hardware, software and services

- Servers, handheld devices, personal computers, printers, tablet PCs etc
- Multi-vendor hardware and services



Multi-vendor

- helps you manage your multi-vendor environment through our extensive partnerships
- provides you single point of ownership


invent

IT IMPACT ON MODERN BUILDINGS

Dr. David Ong
Deputy Chief Operating Officer
CNA Engineers Pte Ltd

IT IMPACT ON MODERN BUILDINGS

Presented By

David Ong
Deputy Operating Officer

CNA Engineers Pte Ltd

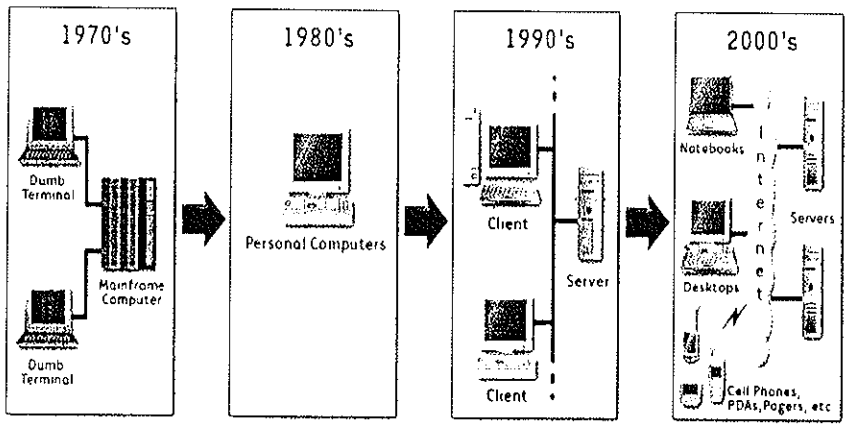
Definition

TOPIC: IT IMPACT ON MODEL BUILDINGS

- Information Technology (IT):
  - Hardware
    - communication, computer, measurement, device, etc
  - Software
    - protocols and application
- Model Buildings:
  - Commercial, Industrial, Infrastructures
- Impact Areas Considered:
  - Building Automation , facilities and security operation and maintenance,
- Enterprise Application Software *NOT* in scope:
  - ERP, SCM, CRM, MES, E-bussiness .....

Controls n'N'd Automation

Information Technology Evolution



Mainframe & Dumb Terminal Architecture

Birth of PC: Stand-alone PC Architecture

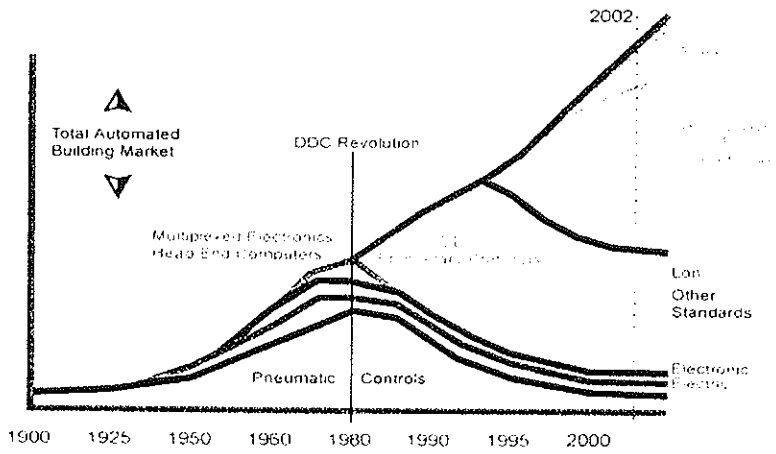
Networked PC's with Client-Server Architecture

Web Browser & Web Server With Wireless Devices Architecture

Source: IBM

Controls a'N'd Automation

Automated Buildings Evolution



Source: Automated-Buildings

Controls a'N'd Automation

Information Technologies that Impact BAS

Major improved information technologies
are in IT protocols, Web Services, & Wireless.

IMPACT AREAS:

- **Communication (Interface)**
  - PC-to-PC
  - SW-application-to-SW-application;
  - cross-network; cross-platform; cross-discipline
- **Software (protocol and application)**
  - maintenance and operation
- **Hardware**
  - wireless and web-based

Controls a'N'd Automation

Impact of Web Services Revolution

- Content is dynamic
  - From Single and Static content to dynamic with different sources execution
- Bandwidth is broader and cheaper
  - Graphics, Voice, & Audio streaming on the same source
- Storage is cheaper and more stable
  - New hardware and software technologies make it possible
- Enterprise computing is easier
  - Interoperation among various levels of services: Enterprise software, Facilities information, energy consumption, etc.

Controls a'N'd Automation

Web Services Communication Protocols

Web pages data structure and file format improve from

HTML (Hypertext Markup Language) &
HTTP (Hypertext Transfer Protocol)

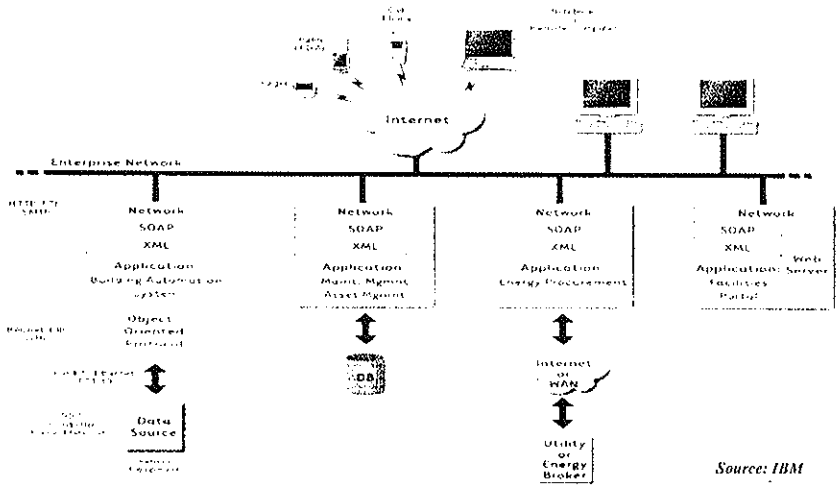
To very flexible modeling language:

XML (eXtensible arkup Language) &
SOAP (Simple Object Access Protocol)

Major product and platform now support the web services architecture using XML and SOAP, including MS .NET, IBM WebSphere, SUN SunOne, Oracle 9i, WebLogic, etc.

Controls a'N'd Automation

Web Service Architecture



Source: IBM

Controls a'N'd Automation

Wireless Revolution

- Technologies and Product are more reliable and cheaper
- Web-enabled appliances and products:
  - PC, Cell phone, pagers, camera, web pads, PDA, sensors, etc.

Controls a'N'd Automation

Impact of Wireless Revolution

- Wireless Service
  - Appliances can connect to internet wirelessly
  - Provide maintenance and operation services on site
- Wireless Sensors
  - Wireless measurement instruments
  - Practical choice for retrofits, historic building, glass structure...
- Wireless Monitoring and alarming
  - Wireless transmitter and camera mounted near equipment being monitored
  - Equipment alarm message can be delivered via pager, fax, e-mail, PCS or telephone.

Controls a'N'd Automation

Application Software

- Integrated Facility Management System (IFMS)
- Maintenance Management Services (MMS)
- Facilities Management System (FMS)
  - Asset Management
  - Work Order
  - Purchase Order
  - Documentation
  - As-Built Services
    - Drawing management
    - On-Line Manual
  - Resources Management
  - Space Management
  - Tenant & Energy Consumption management
- Structure Cabling Management

Controls a'N'd Automation

Impact of Application Software

- Centralized control and monitoring
- Any-where monitoring
- Efficient
- Lower manpower and operating cost
- Ease in maintenance
- etc.....

Controls a'N'd Automation

SOME TYPICAL DEVICES
&
CASE STUDIES

Controls a'N'd Automation

Future IP Advantage

➢Voice & Image over IP

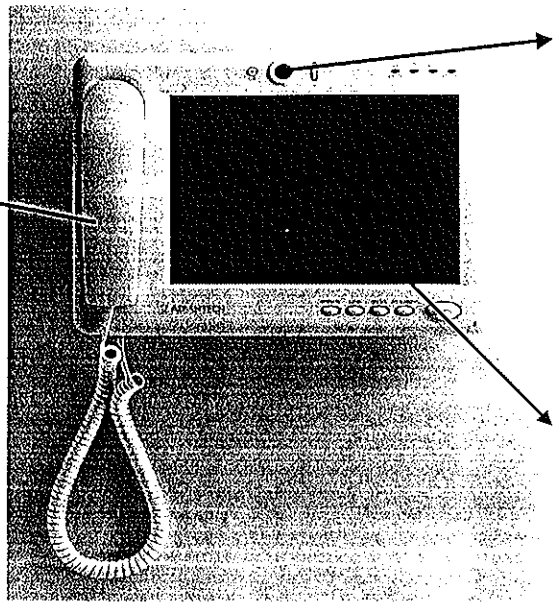
Few Year Back –
IDD Telephone & Tele-conference call provided by Telco (Expensive)

Now with IP Technology –
IP phone replace the traditional phone

➢Advantage:

✓ Cheaper rate
✓ Allow image to be transferred on-line with tele-conferencing function

Controls a'N'd Automation



IP Phone
Allow long
distance
Call with
cheaper rate.

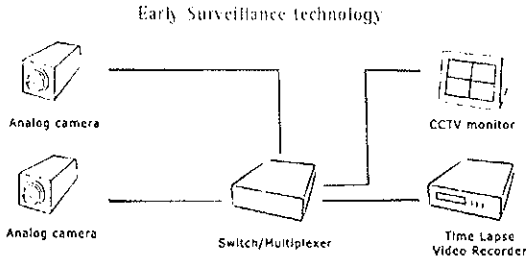
CCD
Camera for
Online image
And
Tele-
Conferencing

Color LCD
Display for
Image and Web
Access.
Also Provide
Touch Screen
Keyboard

Controls a'N'd Automation

1970s – Analog CCTV

Early Surveillance technology

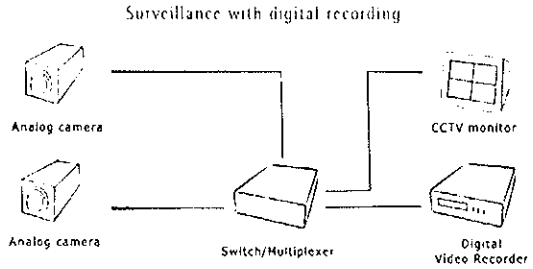


In early surveillance technology, CCTV systems
were based on analog recording technology and costly coax cabling.

In recent years, several shortcomings have come apparent:
- Labor and maintenance demands e.g. changing of tapes
- Image quality deterioration over time
- Limited integration potential
- No remote accessibility

Controls a'N'd Automation

1990s- Digital Video Recording

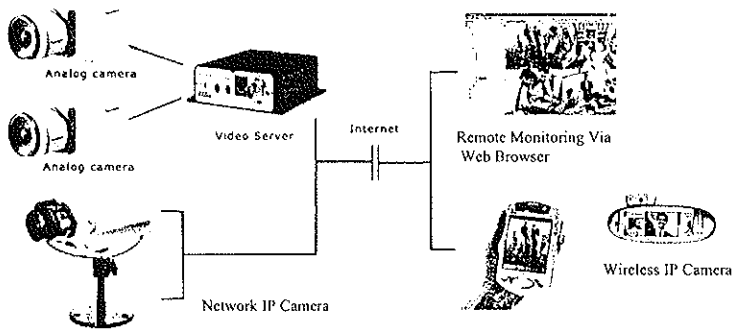


Digital video recording became increasingly attractive for several reasons:

- **Superior search capabilities**
- **No image degradation**
- **Improved compression and storage**
- **Integration potential**

Controls a'N'd Automation

IP-Surveillance Camera



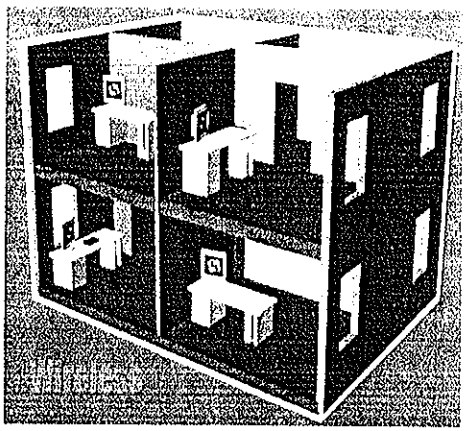
With IP-Surveillance, the site of action transfers to the camera which dramatically improves functionality and cost:

- **Reduced cabling and installation costs**
- **Digitalization and compression within the network camera/video server**
- **Embedded Web server for remote access over the LAN/Internet**
- **Integration with existing analog CCTV systems**
- **Possibility for remote storage, reliable and secure**

Controls a'N'd Automation

Wireless Network In Modern Building

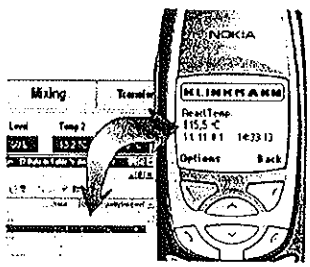
- Users can set them up without running cables between their Computers
- Allow a user with a laptop the freedom to roam about in the office still maintain access to the Internet and the rest of his network.



Controls a'N'd Automation

Wireless Network In Modern Building

- Users can monitor or set the Room temperature and other devices via Hand phone
- Book Meeting room via Hand Phone



Controls a'N'd Automation

CASE STUDY #1
IBMS Project

Controls a'N'd Automation

CNA's IBMS Job References

CNA SIRIUS™ 9000 is the leading IFMS in Asia.

• Kandang Kerbau Hospital	Commissioned
• Nanyang Polytechnic Campus	Commissioned
• Tan Tock Seng Hospital	Commissioned
• URA HQ	Commissioned
• Changi Airport T1 Extension	Commissioned
• New Ministry Of Education Building	Commissioned
• New Housing Development Board HQ	Commissioned

More than 50% of the IFMS market in Singapore













Controls a'N'd Automation

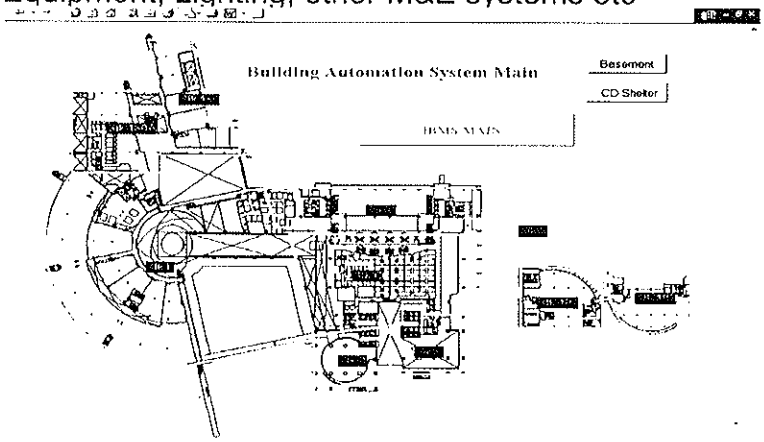
Key Benefits of CNA IBMS

- IBMS facilitates the following systems:
  1. Centralized SCADA System
  2. Intelligent Display System
  3. Facility Management System
  4. Help Desk System
  5. Management Services
- IBMS provides time and cost efficiencies in operation and maintenance of various facility and documentation systems.
- IBMS enables more efficient monitoring and saving in energy usage.
- CNA's IBMS design is an Open System Architecture (All hardware and software used are non-proprietary)
  →→ Upgradeable and Expandable.

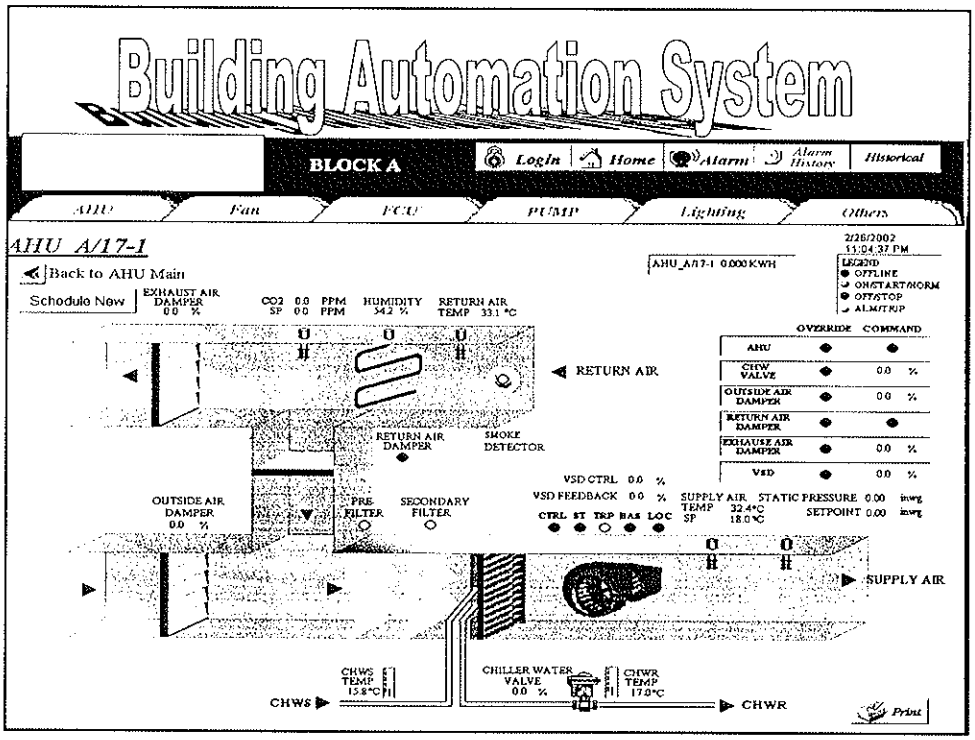
Controls a'N'd Auto

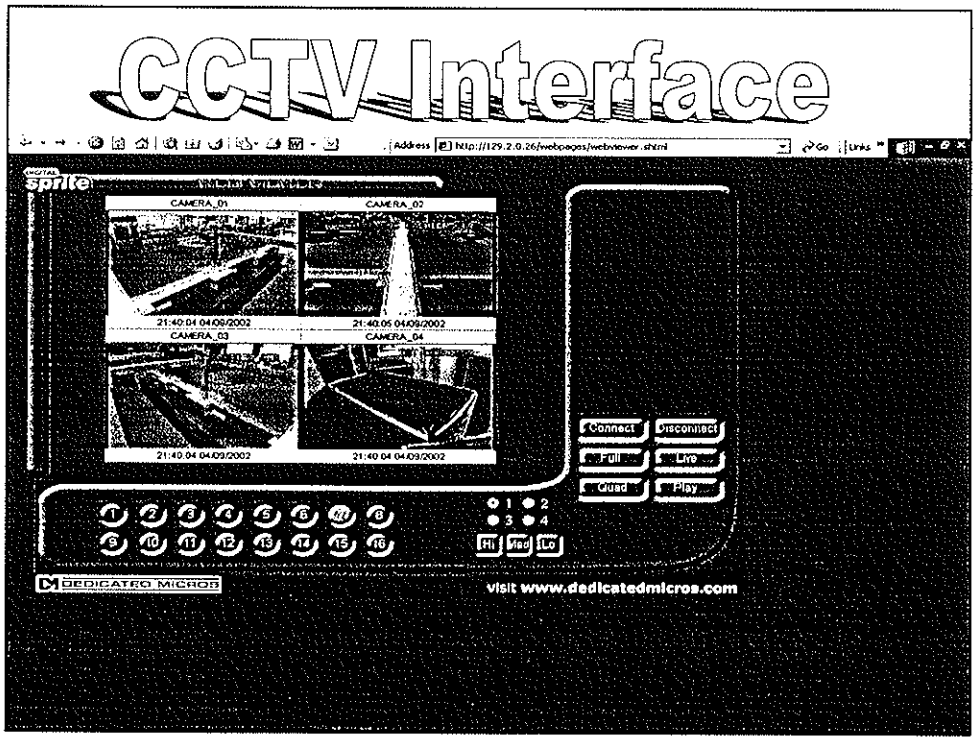
Building Automation System

- Provides centralized monitoring and control of ACMV Equipment, Lighting, other M&E systems etc



Controls a'N'd Automation

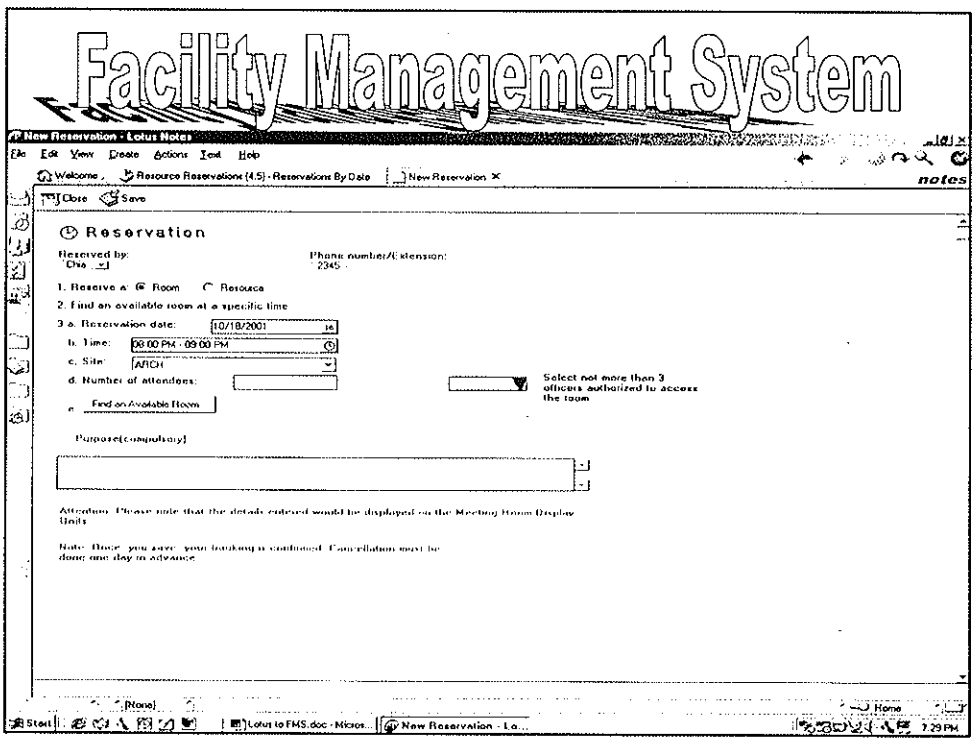

Building Automation System
BLOCK A
Login
Home
Alarm
Alarm History
Historical
AHU
Fan
FCU
PUMP
Lighting
Others
AHU A/17-1
Back to AHU Main
Schedule New
EXHAUST AIR DAMPER
CO2 SP
PPM
HUMIDITY
RETURN AIR TEMP
AHU_A/17-1 0.000 KWH
LEGEND
OFFLINE
ON/START/NORM
OFF/STOP
ALM/TRIP
OVERRIDE
COMMAND
AHU
CHW VALVE
OUTSIDE AIR DAMPER
RETURN AIR DAMPER
EXHAUSE AIR DAMPER
VSD
RETURN AIR
RETURN AIR DAMPER
SMOKE DETECTOR
OUTSIDE AIR DAMPER
PRE FILTER
SECONDARY FILTER
VSD CTRL
VSD FEEDBACK
SUPPLY AIR TEMP
STATIC PRESSURE
SETPOINT
CTRL ST TRP BAS LOC
SUPPLY AIR
CHWS TEMP
CHILLER WATER VALVE
CHWR TEMP
CHWS
CHWR
Print


CCTV Interface
Address
sprite
CAMERA_01
CAMERA_02
CAMERA_03
CAMERA_04
Connect
Disconnect
Full
Live
Quad
Play
Hi
Med
Lo
DEDICATED MICROS
visit www.dedicatedmicros.com

Facility Management System

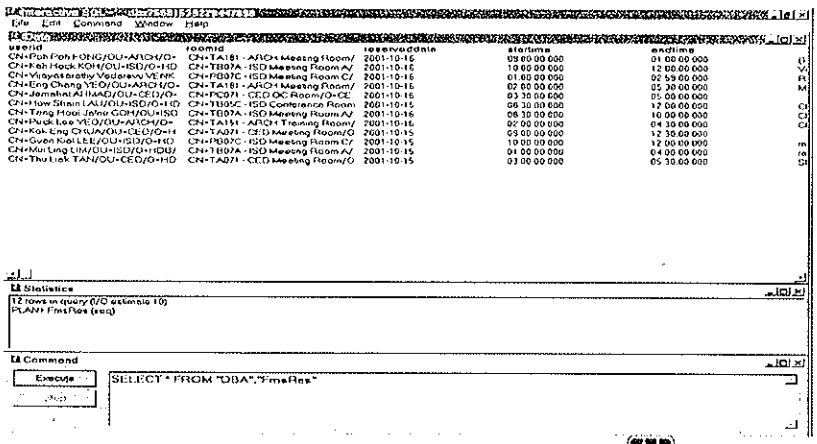
- Provide bookings for meeting and function rooms. Enables ***energy saving*** by turning on the air-con and lighting only when rooms are booked.
- Interface with Email/Scheduling systems.
- Enable intelligent recording of total room utilisation for ***billing*** purposes.

Controls a'N'd Automation



Facility Management System

- IBMS reads booking information to System Database, then performs equipment command.



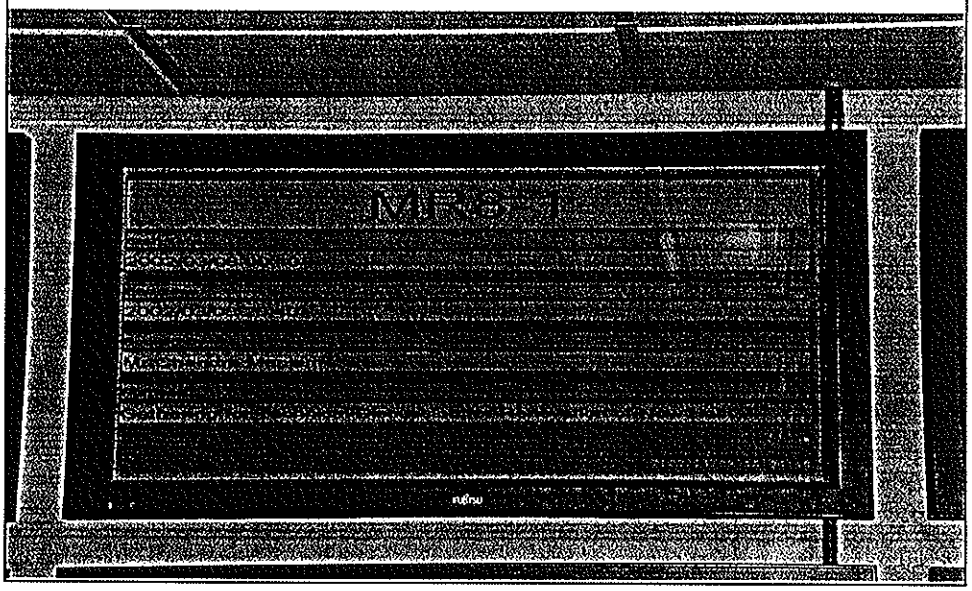
Controls a'N'd Automation

Intelligent Display System

- Provide information for all Meeting and Function Rooms Bookings.
- Enable Video Broadcast / Messages through clear display interface.
- Interfaced to Facility Management System and Helpdesk System

Controls a'N'd Automation

Intelligent Display System

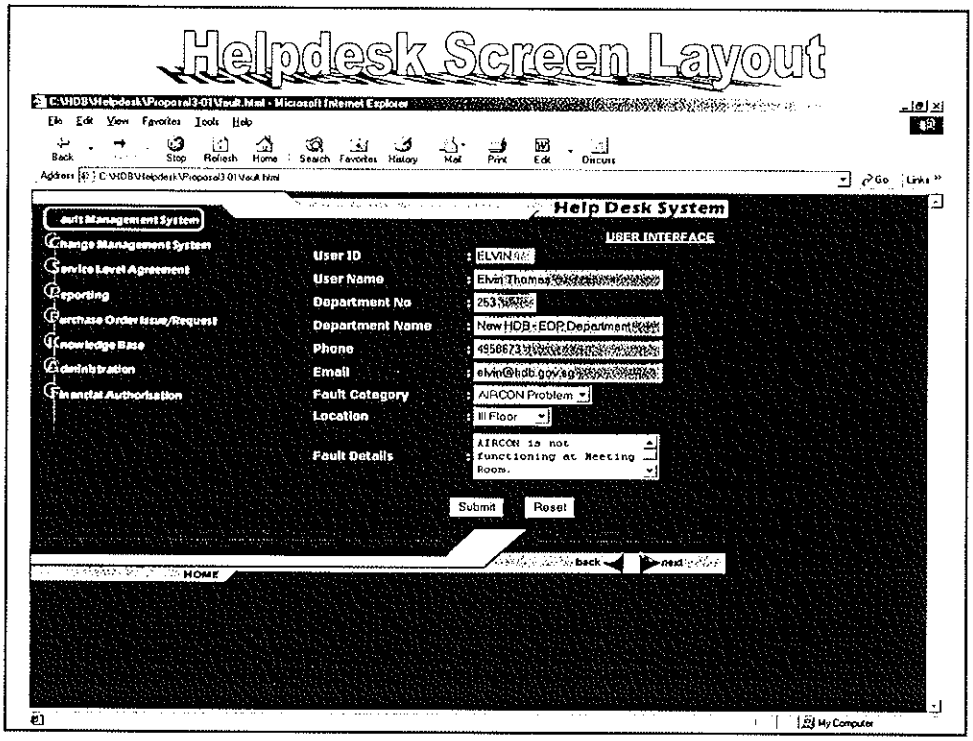


Helpdesk System

- Provide call tracking, maintain a history and progress of every complaint
- Modules include:
  - Fault Management System
  - Change Management System
  - Purchase Order Request/Issue System
  - Service Level Agreement Management (SLAM)
  - Reporting
  - Knowledge Base
  - CTI/IVR/Voicemail
  - Work Flow Automation

Controls a'N'd Automation

Helpdesk Screen Layout



Management Services

- provides the tool for the daily operation management
- web central would enable users to access all the modules from the web browser

Controls n'N'd Automation

Management Services Modules

- Cable Management
- Asset Management
- As Built Services
  - Drawing Management
  - On-line Manual
- Resources Management
- Space Management
- Maintenance Management

Controls a'N'd Automation

Management Services

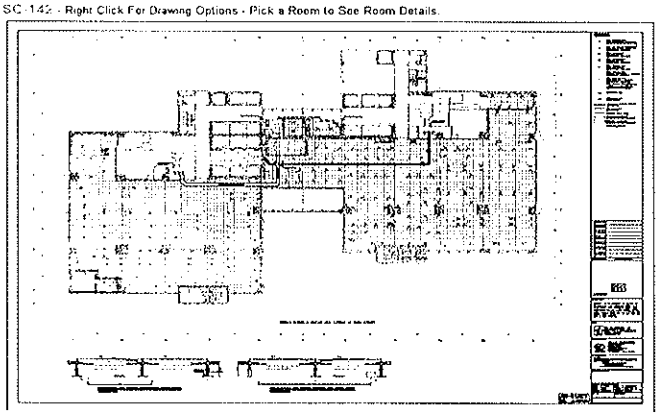
Drawings List

Drawings

Name	Title
SC-107-B1-P6	Basement 1- Cable Layout P
SC-109-B1-P7	Basement 1-Cable Layout P:
SC-141	Storey 15 A&B Cable Layout
SC-142	Storey 16 A&B Cable Layout

<< Prev 10 |
Back to Drawings List page 1

SC-142 - Right Click For Drawing Options - Pick a Room to See Room Details.



CASE STUDY #2:
Island-Wide IBMS

Controls a'N'd Automation

PROPOSED ISLAND-WIDE IBMS SYSTEM

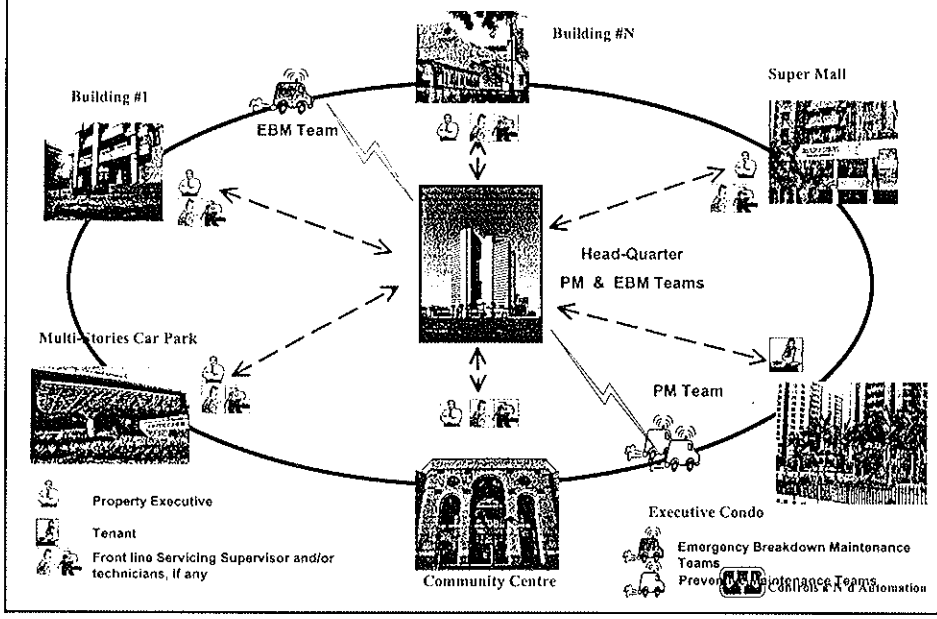
KEY DESIGN FACTORS

- *Provides Integration to existing IBMS at various buildings*
- *Capitalizes the resources and investment of existing HQ IBMS*
- *Low Cost, Reliable. and Flexible system at each building*
- *Provide a proven open architecture system solution*

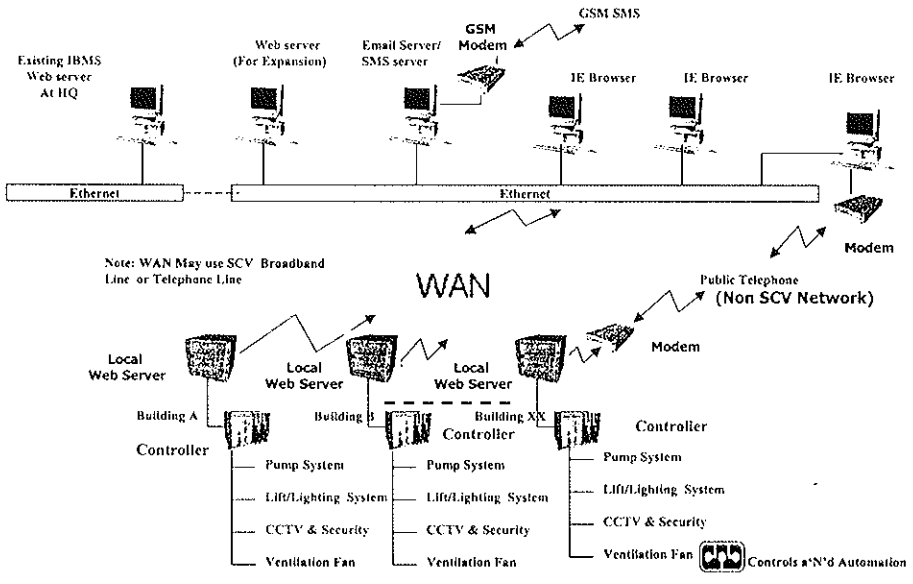
→→ Upgradeable, Expandable, Cost and Operation Efficient.

Controls a'N'd Automation

PROPOSED ISLAND-WIDE IBMS SYSTEM



PROPOSED ISLAND-WIDE IBMS SYSTEM



Island-Wide IBMS System *IN ACTION*



Data Collection

- Temperature, humidity, fire alarm, lift, pump, fans, energy consumption and equipment operating status and alarms
- *Remote video scan*

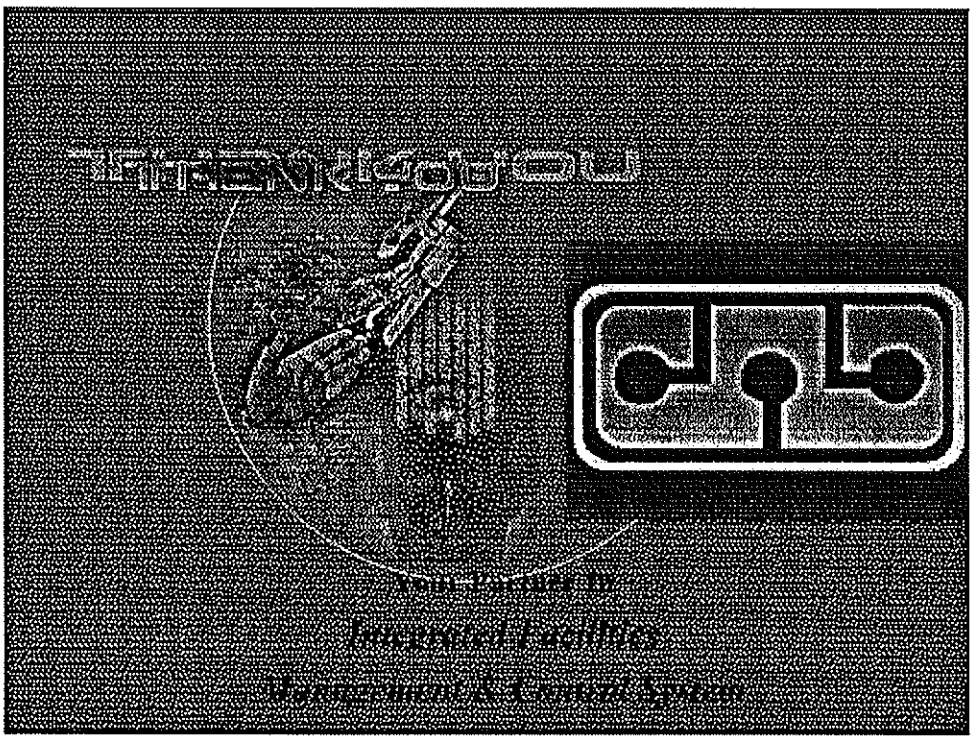
Action

- Starting/stopping equipment
- Direct digital control
- Load shedding
- Energizing fire and life safety equipment
- *Dispatching mobile service teams*
- Communicating with remote personnel

Insight & Analysis

- Plotting efficiency ratings
- High speed calculation of energy usage and operating efficiencies
- *Spot trends, issues* or *problem areas* across entire enterprise system

Controls a'N'd Automation



TRENDS IN LIGHTING CONTROL & BUILDING MANAGEMENT SYSTEM

Mr. Bernard Emby
Managing Director
Clipsal Integrated Systems (M) Sdn Bhd

TRENDS IN LIGHTING CONTROL & BUILDING MANAGEMENT SYSTEMS

REDAS-IES SEMINAR – 25 OCTOBER 2002 IMPACT OF IT ON MODERN BUILDING DESIGN

ABSTRACT

Whilst there is a plethora of information and research available on most aspects of lighting design, fixtures & fittings there is less and often contradictory, information on lighting and building control systems. Information is often manufacturer specific. This is due in part to the sheer speed and dynamic nature of technological development in the field of control systems and the enormous, continuous impact that, the Internet is having on many aspects of the control systems industry.

This paper will provide a high level overview of the key trends in the lighting and building control industries, identify factors driving these trends, and examine possible directions that control systems technology may evolve to. Lastly, the paper will offer a brief commentary on the issue of control systems protocols and standards. This paper is written from a control system manufacturers' perspective.

1 INTRODUCTION

Modern buildings of today commonly support a broad range of electronic and electrical control systems to provide a range of services from communications, connectivity, environmental control, to safety and management systems. Constantly evolving human, economic, technological development and environmental variables are affecting the types of systems that are being deployed in buildings to meet these services requirements.

Of all the factors having the greatest effect on the types of systems being deployed, none has had quite as profound an effect as the enormous technological advancements in microelectronics over the past 30 years.

2 BUILDING SYSTEMS - PAST

Architects and consulting engineers in the 1950's, 60's and 70's typically focused heavily on the provision of basic, standalone systems such as:

- Telephone / PABX
- Heating Ventilation & Cooling (HVAC) – environmental controls

These systems featured little or no integration to other systems. Any small amount of integration that was undertaken, was commonly achieved through physical wiring between systems. Designers and consultants focused mainly on the supply of basic and reliable services such as lighting, power and communications.

Selected large scale projects may have had requirements for:

- Data networking
- Security
- Access Control
- CCTV

but this was typically for specialized projects and tended to be the exception rather than the norm.

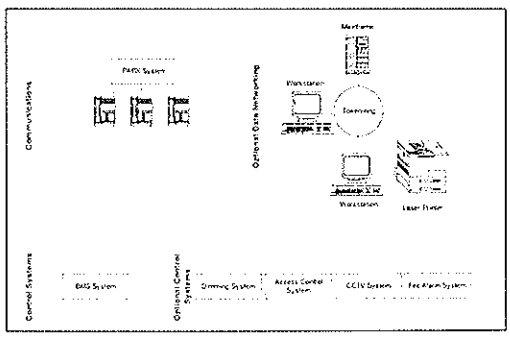


Fig 1.0

4 BUILDING SYSTEMS – PRESENT

From the late 1970's through to the 1990's there have been tremendous developments in microprocessor and electronics technology coupled with

substantial price & size reductions. These developments coupled with advancements in PC and PC software technology spawned a much broader range of electronic services and applications capable of being deployed in buildings. Buildings today commonly feature a broad range of systems from:

- Integrated structured cabling systems for voice and data
- BMS - HVAC
- Security
- CCTV
- Access control
- Fire Alarm
- Lighting Management

These systems are now commonly accepted as standard in most new buildings.

Integration between these systems has also become far more sophisticated. Ethernet technology and sophisticated protocols such as TCP/IP have enabled manufacturers, building managers and tenants striving to achieve better services and applications to do so. The common method that more innovative and better services are offered is through the integration of various systems.

Many of the current systems offer tremendous advantages in terms of flexibility and predictable environmental control. Integration of these systems can deliver many benefits as overall building intelligence and manageability is improved through the sharing of information and interaction of various systems. Examples of such benefits include:

E.g.1 In the event of a fire, the fire alarm system communicates with:

- the lighting control system to switch all lights on.
- the HVAC systems to turn air conditioning off.
- the access control system to release selected doors and emergency exits.

In addition to initiatives by various manufacturers to attempt to produce standardized, inter-operable technology and electronic chipsets (manufacturers such as Clipsal, Siemens, ABB and Echelon), the core technologies enabling high-level integration are TCP/IP and Ethernet.

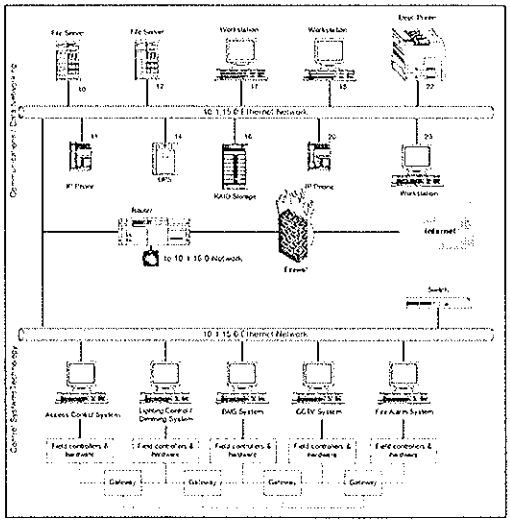


Fig 2.0

5 CURRENT INDUSTRY TRENDS

5.1 The Definition of Digital Convergence

- Convergence \n. [Cf. F. convergence.] The condition or quality of converging; tendency to one point.
- Convergence n 1: the occurrence of two or more things coming together 2: the act of converging (coming closer).
- Source: Webster's Revised Unabridged Dictionary.

In simple terms for the building controls industry, convergence can be defined as tighter, better integration and "feature crossover" of hardware & software technologies. Convergence is affecting many technology manufacturers and is presenting users and manufacturers with new and exciting possibilities to expand the functionality of control systems in buildings as well as questions as to where their technologies fit best.

5.2 Digital Convergence – Examples

There are a number of good examples of how the convergence of certain technologies is providing users with exciting new products:

- Pocket PC enabled devices – Compaq IPAQ - data, audio / video,

& wireless networking; www.microsoft.com/pocketpc
- Mobile Phones – smart mobile phone devices, Nokia Communicator; Phone/Camera/Fax/Internet/Organizer/Media Player. Mobiles supporting MMS (multi-media messaging) www.nokia.com
- Web based browser control & management systems; www.tridium.com www.coactive.com
- Smart lighting ballasts and transformers – more efficient performance and expanded control; www.dali-ag.org

As appliances in general, are becoming increasingly more intelligent, the distinction between appliances and computing devices appears increasingly blurred.

5.3 Digital Convergence - Driving Factors

There are a number of key factors that are driving convergence, these can be divided loosely into 3 categories:

Technology Drivers
- Faster data networks.
- Faster, cheaper and more powerful microprocessors.
- More embedded intelligence.
- Emergence of Internet software standards.

Industry Drivers
- Industry deregulation – Telco & Power industries.
- Increased environmental and energy management legislation.
- Increased competition.
- Cost of power.

User Drivers
- Systems that are easier to use.
- Higher expectations of people/occupants/users regarding quality of living & working environment.
- Operational costs.

5.4 Enabling Technology - Embedded Devices

In 2003, it is predicted that upwards of 50% of online user interactions will involve multiple coordinated information appliances and intelligent devices (e.g. cars, electrical meters, etc.). Over the next 3-5 years, device networking & integration is predicted to grow at greater than 45% compounded annually e.g. smart ballasts, smart addressable light sources. Between 2003-2005, 20% of all mass market products (cars, phones, information appliances, etc.) will start to be built with Internet connectivity(The Harbor Research Report 2001).

A leading technology commentator, Nicholas Negroponte predicts; "The dominant user of the Internet in the future will not be people at all. It will be machines talking to one another in ways we cannot imagine."

5.5 Enabling Technology – Internet Browser Technology

Internet browser technology is now a firmly established technology with tremendous advantages, particularly in the field of control systems:
- Simple to use &commonly available.
- Users are acquainted with the technology.
- Compatible with multiple operating systems - Windows, Unix, Linux.
- Cheap, unified user interface.
- Multiple users can use the interface simultaneously from local or remote locations – client / server architecture.

However the technology is not without problems, these include:
- HTML is not optimized to run control applications.
- Speed of operation can be an issue.
- No push technology – update on refresh only.
- Limitations are being addressed by incorporating code & web servers into system hardware itself – systems are getting much "smarter".
- Security is critical and difficult to get right – vendors are currently resolving SSL & Certificate issues.
- Expense & limitations on Fixed IP addresses.

5.6 Lighting Control & Management Systems

Intelligent lighting control & wiring systems are increasing in popularity for a number of reasons, namely they:

- Overcome limitations of conventional wiring.
- Are flexible and easy to reconfigure through software as opposed to hard wiring changes.
- Provide enhanced switching options.
- Provide central control options.
- Provide more accurate control of illumination levels.
- Provide enhanced methods for creating sophisticated lighting effects / scenes.
- Provide owners and facilities managers with opportunities to conserve & manage energy usage through presence detection, scheduling, ambient light level sensing and central control.

The increased intelligence is starting to see the merging of engineering disciplines, particularly electrical engineering and data networking.

5.7 Lighting Control & Management Systems – Energy Conservation

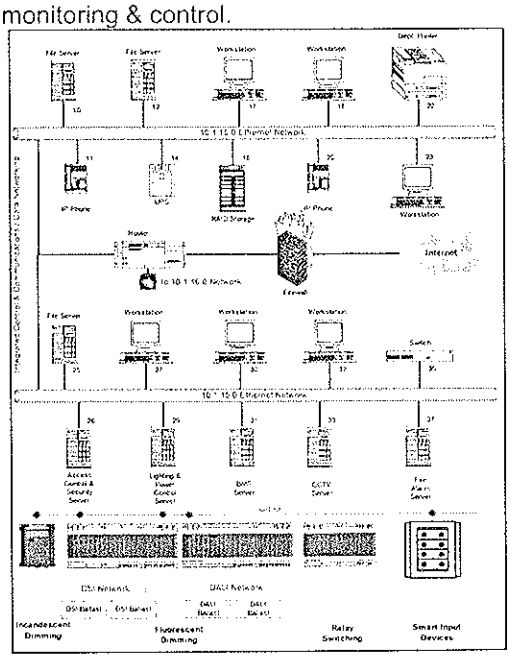
Diminishing resources and environmental impact is placing increasing pressure on governments to implement energy conservation / reduction initiatives and encourage better use of power and natural resources- Indian Energy Conservation Act 2001. The price of power is increasing and it makes increasing sense for companies to invest in technologies, which can provide returns on their investment by substantially reducing operating costs.

Lighting constitutes approximately 18% of India's total consumption of power. Various devices from more efficient light sources and ballasts to control systems are becoming increasingly important as government; corporations and individuals work to reduce energy consumption.

In addition, government is starting to account for the true cost of power (inclusive of environmental impact).

5.8 Converged Building Control Systems

Ethernet is the one of the most pervasive & successful technologies, for integrating and networking systems. Ethernet LAN connectivity is a common medium for integrating communications and controls systems. Ethernet is a globally established technology, supported by many manufacturers and developers. Established internet standards & internet browser technology are influencing how systems are deployed, operate and integrate, they also permit distributed and remote access, monitoring & control.



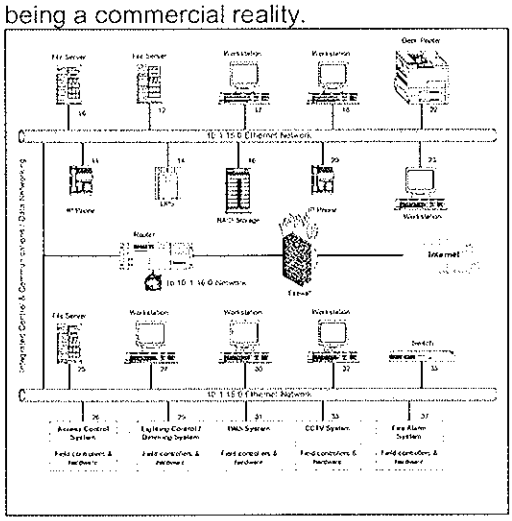
6 THE FUTURE OF BUILDING CONTROL SYSTEMS

6.1 Fully Converged Building Control Systems

At least one device in each subsystem will be capable of being IP addressable, with built in web serving and configuration capabilities.

Operating system and networked devices support automatic discovery, identification, and configuration, so lighting / control / automation /security devices etc will just be another device in the network.

Sub system networks will connect to computer networks and present their configuration & control data in standardized formats such as (MMC) Microsoft Management Console. Sub systems will appear as extensions to PC's. This technology is probably 2-3 years away from being a commercial reality.



7 STANDARDS & PROTOCOLS

Multiple standards and protocols exist for various applications – there is no "one size fits all technology". There continue to be a range of major control systems / protocols such as C-Bus, DSI, DALI, EIB, Lonworks, Mod-Bus and a range of other proprietary players who provide excellent solutions and whose products will continue to integrate more tightly. Multiple systems and standards exist for a number of reasons; it is apparent that one standard cannot meet all functional requirements and cost parameters for all applications.

There are arguments both for and against standards. The one clear point is that there are many standards and not one dominant standard.

In addition, contrary to marketing claims, standardization generates its own set of limitations. Though the use of open protocols allows a degree of freedom for customers, it stifles application creativity as manufacturers are forced to agree on new functions before implementation of upgraded protocol feature sets. As standardization goes beyond defining exchange of data and begins to dictate how applications are performed, it lengthens development time for innovations.

One of the largest issues with the provision of open systems is the issue of warranty. Even if systems support inter-operability, who does the customer get warranty from if a system is made up of components from multiple manufacturers? The challenge of standards in the lighting and building control systems industries is to integrate technology and address thorny commercial considerations of manufacturers.

8 SUMMARY

Digital convergence of technology is driving integration of systems in the lighting and building controls industries.

The Internet, established technology such as Ethernet and protocols such as TCP/IP are influencing how lighting and building control systems are being deployed.

Internet browser technology is emerging as a dominant user and programming interface.

The dominant theme is diverse systems, integrating over local area, Ethernet networks and the Internet.

The issue of standards remains open, with multiple offerings from many manufacturers and many commercial issues posed by integration still to be resolved., however the choice for consumers has never been better.

9 SOURCES

- Open Systems; the Basic Guide to OSI and its Implementation. Judge, Peter J, 2000
- The Harbor Research Report, 2001
- The Open Book : A Practical Perspective on OSI Rose & Marshall,1989
- Continued Popularity, New Capabilities Assure the Future of the PC; Microsoft Corporation; www.microsoft.com; 2001

10 USEFUL WEBSITES

- ASHRAE – www.ashrae.org
- CABA – www.caba.org
- Clipsal Integrated Systems – www.clipsal.com/cis
- Custom Electronic Design Installers Association – www.cedia.org
- DALI – www.dali-ag.org
- International Standards Organization – www.iso.ch
- Parkes Associates – www.parksassociates.com
- The International Electro-technical Commission – www.iec.ch

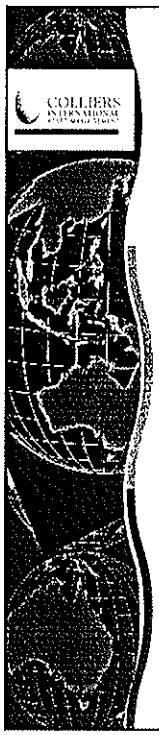
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APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

Mr. Wong Yew Heng
Chief Operating Officer
Colliers International Asset Management



IES-REDAS JOINT SEMINAR

'IMPACT OF IT ON MODERN BUILDING DESIGN'

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

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APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

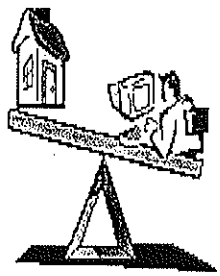
THE IMPACT OF TECHNOLOGY ON FACILITIES MANAGEMENT

- 'Intelligent' buildings becoming the focus of owners and occupiers
- Growing expectation for buildings to be managed in a new hi-tech way
- Fresh demand for a new breed of Facilities Managers

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMNT

A FACILITIES MANAGER'S DIVERSE ROLE

Possible Work Scope



- building maintenance & management
- renovations
- space & workplace planning
- engineering maintenance
- financial management
- lease negotiations & tenant management

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

A FACILITIES MANAGER'S DIVERSE ROLE

Possible work scope



- asset enhancement
- future portfolio planning
- acquisition and disposal of assets
- contract negotiation & purchasing
- provision of information technology
- total quality management

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

DIFFERENT ROLES OF TRADITIONAL FACILITIES MANAGER & MODERN DAY FACILITIES MANAGER

- FM takes on a new dimension with the advent technology



Traditional Facilities Personnel



Techno Facilities Personnel

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

THE CHANGING ROLE & RESPONSIBILITIES OF THE FACILITIES MANAGER

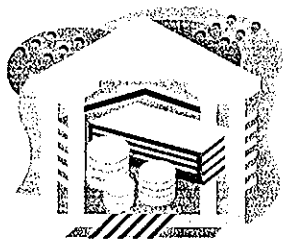
A far reaching & taxing role for today's facilities managers

- the integrated expert with multiple skills and wide knowledge
- the almost perfect public relations officer
- the highly skilled negotiator
- the great strategist
- the excellent procurement & management personnel

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

EXPECTATIONS OF BUILDING OWNERS

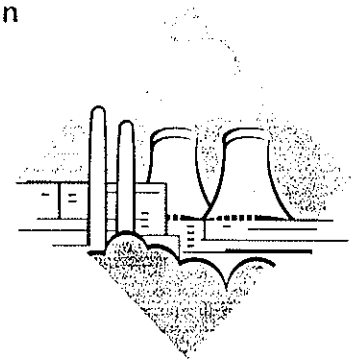
- realization of the full potential of assets
- making money out of assets
- achievement of cost savings



APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

EXPECTATIONS OF BUILDING OWNERS

- **Improving the energy efficiency of a building**
- **Reducing energy consumption**



APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

CHALLENGES FACING FACILITIES MANAGERS

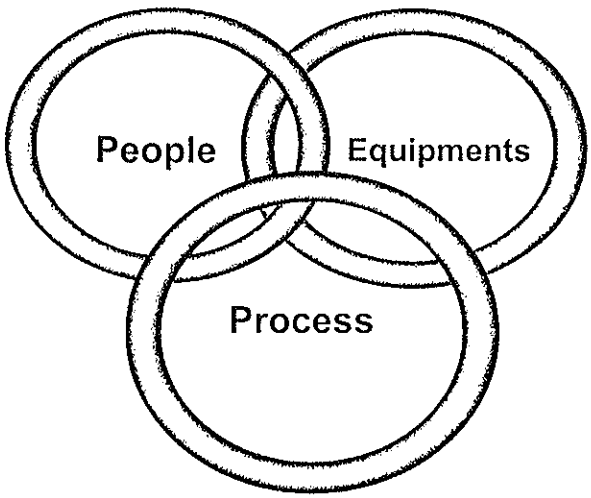
On the business front

They need to have:

- knowledge & skill to improve business efficiency
- realistic practical ability to implement changes smoothly

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

EFFECTIVE CO-ORDINATION TO IMPROVE EFFICIENCY





APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

APPLICATION OF TECHNOLOGY: MANAGING FACILITIES THE HI-TECH WAY

Eg. An Industrial Facility

- Mechanical and electrical systems are *complex*.
  - Equipment are *widely dispersed*, often hard to get to
    - scattered equipment rooms, false ceilings, ducts.
- Operating staff must *start, stop* and *adjust* these equipment in anticipation of the environmental needs.



APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

IMPLICATIONS OF EQUIPMENT NOT RECEIVING THE RIGHT ATTENTION AT THE RIGHT TIME

- M & E plants *depreciate* rapidly
- Environment becomes *less and less comfortable*
- *Breakdowns* will occur with increasing frequency
- *Energy* will be wasted



APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

HIGH COSTS ARE GENERATED IN THREE WAYS

- **Excessive labour requirements**
  Personnel must *walk* around the plants and equipment to start, stop and check on the various systems.
- **Inefficient use of the environmental systems**
  Equipment usually run *one to two hours before and after* they are really needed, because personnel require time to make the rounds.
- **Expensive repairs**
  Mechanical equipment *get out of adjustment* because most of the time no one is there to supervise them. Such faulty operations sometimes go undetected until *complications* set in.



APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

AN INTEGRATED INTERNET-ACCESSIBLE FACILITITES MANAGEMENT SYSTEM can ...

- **Reduce labour costs**
  Through internet-accessible software package to control *thousands of equipment functions* throughout the buildings

  Personnel that were formerly required to check on and adjust equipment can be deployed to *positions of greater effectiveness*
- **End inefficient use of systems**
  Run equipment *only when needed*

  Track key environmental parameters

  Start, stop or *adjust* equipment

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

- **Gathers data**
  Temperatures, pressures, energy consumption

  Operating status (on or off, alarm or normal)

- **Analyze data**
  Centrally logging or *displaying* gathered data in order to compare it with normal or desired conditions

  Reporting any *abnormal* or *alarm conditions*

  Plotting *efficiency ratings* for various systems or devices

  High speed calculation of *energy usage*, *mechanical efficiency* of equipment, and other *abstractions* in order to get the most of the environmental systems

APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

- **Takes action**



  Starting and *stopping* equipment

  Direct digital control of HVAC equipment

  Scanning alarms

  Energizing fire and life safety equipment

  Dispatching maintenance crews or guards

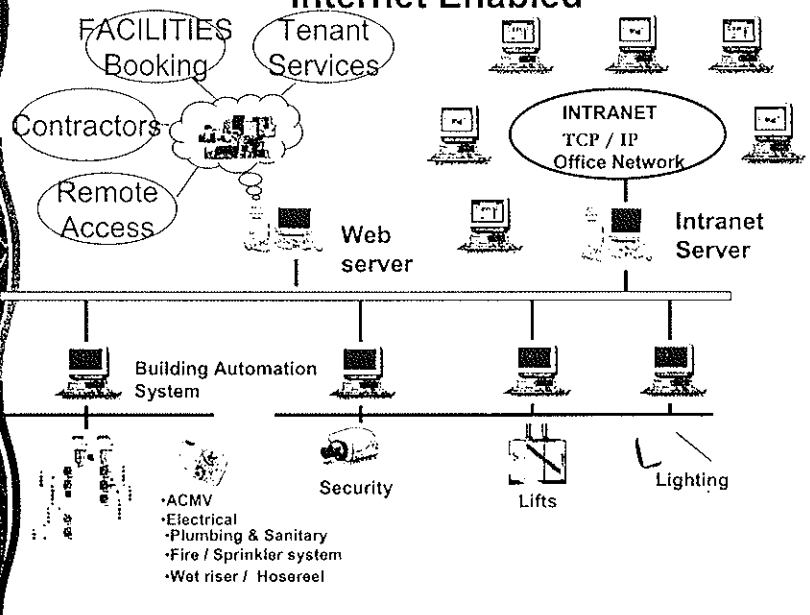
  Communicating with remote personnel

- **Powerful**
  System features ranging from *SMS messaging system* to *teleconferencing*, to *priority indexing alarms*, to *dynamic trending* make information management easy

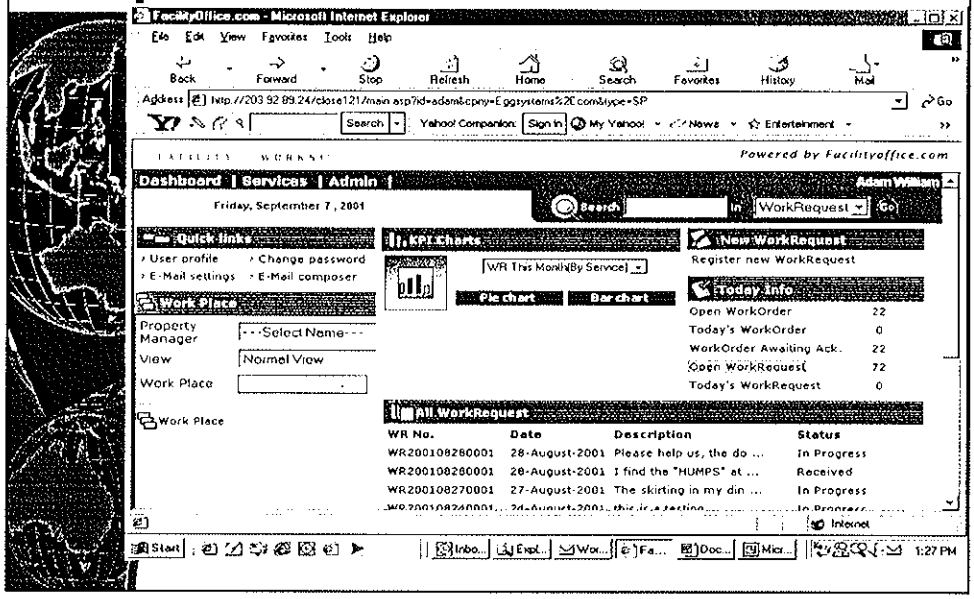
APPLICATION & IMPLICATION OF TECHNOLOGY ON FACILITIES MANAGEMENT

USING TECHNOLOGY TO CREATE ADDITIONAL VALUE FOR CLIENTS

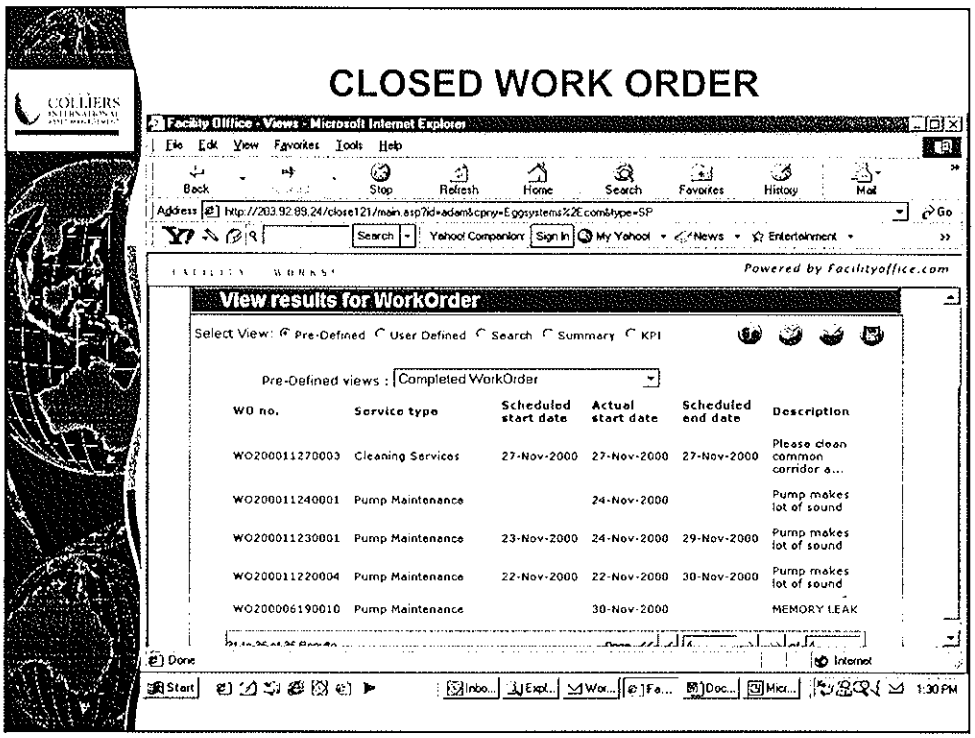
Intelligent Buildings which are fully Internet Enabled



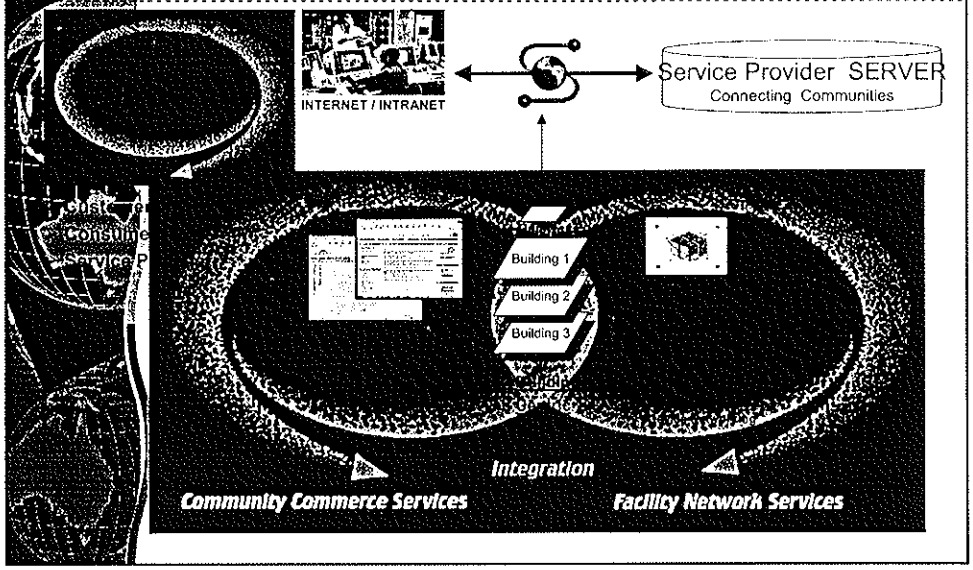
OPEN WORK ORDER



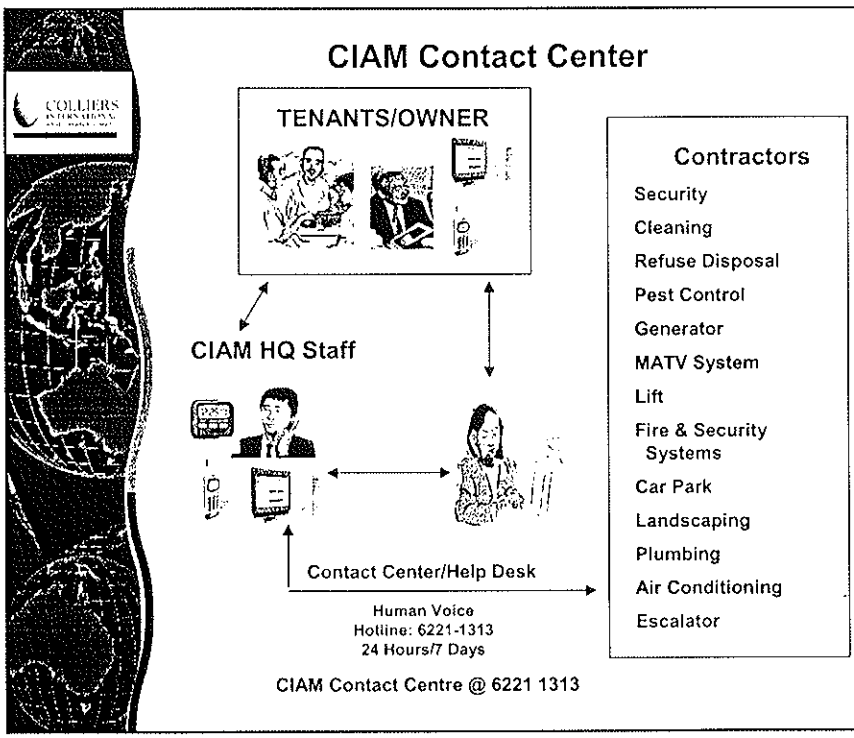
CLOSED WORK ORDER



APPLICATION SERVICE ARCHITECTURE.....



CIAM Contact Center




COLLIERS
THANK YOU!