The controls market offers many diverse and viable solutions to your control applications.

How do we ensure that we select the optimum solution?
Agenda

Introduction

Stand Alone Systems

Configurable Systems

Open Systems

Programmable Systems

Enterprise Systems & Integration
History – From 1975 to 2000

- Introduction
- Expertise
- Functionality
- Application

Diagram showing a red line representing expertise and an arrow pointing upwards indicating application.
The SCOPE Framework

Stand Alone
Traditional Stand Alone Systems

- Applications
  - Uni-functional
- Easy to Operate
- Low Expertise
  - Easy to Install
  - Easy to Service
  - Easy to Replace
- Low Cost
  - Availability
  - Easily Selectable
Modern Stand Alone Systems

- Easy to Operate
- Cost-effective

... for a wide range of applications
Applications

- Commercial Office Buildings
- Nursery, Primary, Secondary Schools and Colleges
- Health Centres
- Residential Care Homes
- Small Hotels
- High Value Private Homes
Summary

- Select Stand Alone Systems for
  1. Simple Applications
  2. Ease of Operation
  3. Easy Installation
  4. Reduced Serviceability
  5. Free Availability

Stand Alone Configurable

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Why Configurable?

Stand Alone Systems
- Low Expertise
- No Programming
- Limited Applications

Configurable Systems

Programmable Systems
- Specialised Engineering
- Programming Expertise
- Unlimited Applications
What are Configurable Systems?

Configure combinations of control schemes for varied applications quickly, accurately, efficiently and with low programming skills … whilst … maintaining the applications of freely programmable systems.

Pre-written proven solutions using latest control algorithms for
- energy savings,
- equipment lifetime protection and
- healthy environment operation.
How is this achieved?

Create Project

"Click and Select" Mechanical Application

"Download" Application to Controller
Preset Front End Graphics, O&M Manuals

Generates your documentation quickly and professionally.
Is it ok, to write "Preset" instead of the too long "Auto Generated"?

Helmut Tanner, 09/02/2009
Typical Applications

- Supermarkets
- Light Industrial
- Educational Facilities
- Care Homes
- Clinics
- Hotels
- Police & Fire Stations
- Prisons
- Military Installations
Summary

- Select Stand Alone Systems for
  1. Configurable applications – where it can fit
  2. Use as tool to produce plant application
  3. Quick selection of customisable application
  4. When programming expertise is limited
  5. Flexibility:
     - Override the application at a later date
     - Possibility of incorporating additional Inputs/Outputs for the future
  6. Networking capabilities
Open Systems – Definition

The flexibility to choose ...
... and seamlessly combine ...
... the best products, systems and services ...
... with the optimum price and performance ...
... from a variety of vendors ...
... in a tailor-made ...
... future-safe building system.
Open Systems – A Concept

Stand Alone, Configurable, Programmable and Enterprise can be OPEN
More History

1970's & 1980's
Proprietary Systems

1990's
Gateways

Today
Open Systems
Proprietary Systems

Benefits

- Proven
- Familiarity
- Economic
- Assurance
- Known Solution

Drawbacks

- Lock in
- Dependent on Specialist Competency
  - Product
  - Protocol
  - Programming Tool
  - Training
  - Service
- Lack of Flexibility
Disadvantages of a Gateway solution

- Numerous systems
  - Lack of effectiveness
  - Complexity in integration
  - Not always viable
  - Still Locked In

- Overlap of functionalities
  - Wastage of assets
  - Operational difficulties
  - Lack of consolidated systems

- Heavy costs
  - Independent hardware and software costs
  - Independent implementation costs
  - Maintenance
  - Inventory
  - Training
Open Systems

Benefits

- Proven
- Common Familiarity
- Economic
- Assurance
- Known Solution
- Protocols not owned by Manufacturer
- Future Proof

Drawbacks

- Knowledge of I.T. Networks required
- Skill Level
- Development of Third Party Drivers
The current situation
The world of open systems is confused with each manufacturer offering different solutions.

The standards?
- No one protocol will dominate
- Numerous successful protocols have to be addressed
- Legacy systems will need to be supported
Common Available Open Systems

- **LonWorks** EN 14908
  - The front-runner of building open systems

- **BACnet** ISO 16484-5
  - Building Automation Control network
  - "Owned" by ASHRAE

- **oBIX**
  - Open Building Information Xchange
  - XML based interface enabling high level enterprise system integration
  - www.obix.org

- **Modbus RTU**
  - Since 1979 the de facto standard for industrial communication networks, also often used for metering applications in commercial BMS solutions

- **Meterbus** EN 1434-3
  - Developed in Europe for the commercial metering market and becoming more popular in the UK. Monitors electricity, gas, water and heat meters
Communication based Industries

- Computers
  - Bluetooth
  - Centronics
  - USB
  - Serial ATA
  - FireWire

- Controls
  - BACnet
  - Modbus
  - OBIX
  - Echelon
  - M-Bus
Open Systems – Seamless Integration

Client PC (Webbrowser) → Client PC (Webbrowser) → Server PC → SQL Database

TCP/IP

Enterprise Integration e.g. via oBIX

Internet

GPRS

Room Controller Master → Integration Controller → Web-based Front End

TCP/IP

LON

Plant Control

LON

BACnet

Lighting Metering

EIB/KNX

M-Bus

Metering

Modbus

Client PC (Webbrowser)

TCP/IP

OpenScope

by Honeywell

February 2009

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Programmable Control Systems

Programmable Systems help develop **highly customised** control schemes and applications based on requirement.

Flexibility to develop control systems based on any HVAC application
### Typical Input/Output Schedule

<table>
<thead>
<tr>
<th>EQUIPMENT &amp; CONTROL FUNCTION</th>
<th>ANALOG</th>
<th>DIGITAL</th>
<th>PERIPHERAL EQUIPMENT &amp; REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INPUT</td>
<td>OUTPUT</td>
<td>INPUT</td>
</tr>
<tr>
<td><strong>FANU</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOA switch &quot;Auto&quot; Status</td>
<td>1</td>
<td>1</td>
<td>Volts Free Contact to DDC from Control Panel</td>
</tr>
<tr>
<td>On/Off Damper Status</td>
<td>3</td>
<td>3</td>
<td>VPC from Damper to DDC</td>
</tr>
<tr>
<td>On/Off Damper Command</td>
<td>3</td>
<td>3</td>
<td>24 Vac on/off signal from DDC to Panel</td>
</tr>
<tr>
<td>Fan Enable / Disable Command</td>
<td>1</td>
<td>1</td>
<td>24 Vac on/off signal from DDC to Panel</td>
</tr>
<tr>
<td>Air Flow Status</td>
<td>1</td>
<td>1</td>
<td>Volts Free Contact to DDC from DPS</td>
</tr>
<tr>
<td>Dirty Filter Status</td>
<td>3</td>
<td>3</td>
<td>Volts Free Contact to DDC from DPS</td>
</tr>
<tr>
<td>Temperature Sensor @ Supply Duct</td>
<td>1</td>
<td></td>
<td>Analog input to DDC from sensor</td>
</tr>
<tr>
<td>Temperature Sensor @ Mixing Box</td>
<td>1</td>
<td></td>
<td>Analog input to DDC from sensor</td>
</tr>
<tr>
<td>Temperature Sensor @ Supply pipe</td>
<td>1</td>
<td></td>
<td>Analog input to DDC from sensor</td>
</tr>
<tr>
<td>Pressure / Vacuum command</td>
<td>1</td>
<td>1</td>
<td>0.4 to 6Vdc signal from DDC to Valve actuator</td>
</tr>
<tr>
<td>Flow / Vacuum Command</td>
<td>1</td>
<td>1</td>
<td>0.4 to 6Vdc signal from DDC to Valve actuator</td>
</tr>
<tr>
<td>Two Stage Cooling Unit Status</td>
<td>2</td>
<td>2</td>
<td>VPC from DX Unit Panel to EDC</td>
</tr>
<tr>
<td>Two Stage Cooling Unit Command</td>
<td>2</td>
<td>2</td>
<td>VPC from DDC to DX Unit Panel</td>
</tr>
<tr>
<td>Humidity Sensor or Off Supply duct</td>
<td>1</td>
<td></td>
<td>Analog input to DDC from sensor</td>
</tr>
<tr>
<td>Humidity Sensor or Off Supply Duct</td>
<td>1</td>
<td></td>
<td>Analog input to DDC from sensor</td>
</tr>
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</tr>
<tr>
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<td>1</td>
<td></td>
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</tr>
<tr>
<td>Humidity Sensor or Off Supply Duct</td>
<td>1</td>
<td></td>
<td>Analog input to DDC from sensor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CYTOTOXIC ROOMS EXTRACT FANS</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HOA switch &quot;Auto&quot; Status</td>
<td>2</td>
<td>2</td>
<td>Volts Free Contact to DDC from MCC</td>
<td></td>
</tr>
<tr>
<td>Air Flow Status</td>
<td>2</td>
<td>2</td>
<td>Volts Free Contact to DDC from DPS</td>
<td></td>
</tr>
<tr>
<td>VTD Auto/Off switch Status</td>
<td>2</td>
<td>2</td>
<td>VPC from VTD panel to DDC</td>
<td></td>
</tr>
<tr>
<td>VTD - Fan speed Command</td>
<td>2</td>
<td>2</td>
<td>0.4 to 6Vdc signal from DDC to VTD</td>
<td></td>
</tr>
<tr>
<td>VTD - Fan Enable / Disable Command</td>
<td>2</td>
<td>2</td>
<td>24 Vac on/off signal from DDC to Panel</td>
<td></td>
</tr>
<tr>
<td>VTD Monitoring Status</td>
<td>2</td>
<td>2</td>
<td>0-10Vdc from VTD to DDC</td>
<td></td>
</tr>
<tr>
<td>Re-Heater Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Sensor @ Re heater</td>
<td>8</td>
<td></td>
<td>Analog input to DDC from sensor</td>
<td></td>
</tr>
<tr>
<td>Re-Heater Control - On/Off Command</td>
<td>8</td>
<td></td>
<td>Analog input to DDC from sensor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>15</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>
Engineering Tools
Select Programmable Control Systems for

1. Customised or bespoke special applications
2. Flexibility – can be re-engineered, tweaked and reused
3. When the required engineering, programming and commissioning skills are available.
Levels of Integration

1. HVAC Integration
   - The integration of heating, ventilating, meters, boilers, chillers, etc.
     All elements of the environmental systems, plant and controls;
     i.e. an energy management system.

2. Building Systems Integration
   - The integration of Fire, Access, CCTV, HVAC, Security, etc.

3. Enterprise integration
   - The integration of the business, operations and systems
     with all or part of the Building Systems.
**Enterprise Integration**

**Enterprise**

is the business and functional activity of a Company or Organisation.

**Building Systems**

are the functional elements required for the environmental, safety, security and comfort of the building and the occupants.

**Integration**

is the merging and interoperability of one or more systems.

**Enterprise Integration**

is the integration of building systems with the Enterprise activity operation, systems and equipment to provide enhanced interoperability, efficiency and security.
Level One Integration

- Building Control Systems

- Intelligent pumps
- Packaged boilers, chiller
- AHU & VRV units
- Utility and Heat Meters
- Communications
- Blinds and Shading
- Solar and GSHP
- Car Park CO Sensing
- Variable speed drives

Separate Control Environments
Level Two Integration

- Building Automation Systems

- Integrated Control Environment

To the Enterprise (Level 3 Integration)
Level Three Enterprise Integration

These systems existed as two separate entities

"Business"
Enterprise is a Business & Functional Activity

"Engineering"
Building Systems were not considered a part of Business & Functional Activities
Integration in the IT World

Data Center & Knowledge Management

Sales
Marketing
Finance
Operations
Manufacturing

Integrated Platform
Enterprise Integration

Energy & Cost Performance and Reporting Software

Building Automation Enterprise Solutions

Enterprise

Building Automation Systems

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of Continuing Professional Development

SCOPE
THIS CERTIFICATE RECORDS THE ATTENDANCE OF
Name
Company
IN COMPLETING
THE PRESCRIBED HONEYWELL
SEMINAR

An Overview of
Building Automation Controls & Systems
(duration One Hour)

This seminar can contribute towards your CIBSE CPD requirement

Harry Salebowne, Sales Director

Certificate No. B2000 Issued on

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Discipline: __________________________
Position: ____________________________
e-mail: _____________________________
Telephone: __________________________

Qualifications to appear on CPD Certificate: ________________________
Course Duration (One or Two Hours): _____________________________

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Integrated Building Services

CentraLine CPD Courses

Please select your next CPD course from those listed below:

- Stand Alone Controls
- Configurable Control Systems
- Open Systems
- Programmable Controls
- Enterprise Integration
- Terminal Units / Fan Coil Controllers
- Sensors. Actuators, Valves
- Water Products
- Domestic Controls
- Inverters

Contact: ____________________________
Mobile: ____________________________
Thank you