Productivity Improvements Through Use Of Automation And Intelligent Devices

Swagelok Technology Summit
November 14 & 15 2006
Houston, TX.

Jim Pinto
Founder (formerly President & CEO) of Action Instruments
Technology Futurist, Speaker, Writer, Author
Industrial Automation Commentator, Consultant

Swagelok

Faster, Cheaper, Better

- Productivity has become a global race
- Fierce, head-to-head competition between regions and nations
- Reason: It is the source of the wealth
  - Key to improvements in living standards
- Those who can produce materials and products cheaper, faster, better – win!

Automation Purpose

- The fundamental purpose of automation is to improve productivity
- Generate increased output with reduced costs
- The intrinsic value of each and every piece of process automation equipment is its ability to provide increased productivity for the user

Technology & productivity

- Technology improves productivity 5 ways
  - Reduce labor
  - Save time.
  - Quality improvements
  - Optimize use of raw materials
  - Save energy and reduce waste
- Labor reduction is **not** the sole objective – it's the best overall productivity
- The best producer wins market-share

Swagelok

Connectivity & Productivity

- Extending Internet connectivity into Automation & Control
- Within the next few years, literally billions of communications-enabled products and processes will provide intelligence and connectivity for almost everything

Self-monitoring Machines

- Imagine every system and piece of equipment monitoring its own operation
  - uptime
  - downtime
  - dwell-time
  - energy usage
  - malfunction
  - repair-time
- Usage reported with an Internet connection

Swagelok

The Pervasive Internet

- Today, 3 billion Internet connections
- Tomorrow 100 billion connections
  - Machines
  - Equipment
  - Sensors
  - Controls

Machine-to-Machine - M2M

- Operating return on investment (ROI) on all plant equipment assets available all the time, any time
- End-users will manage their own assets.

M2M – for Suppliers

- It’s not just end-users — it’s for Suppliers
- Help end-users add M2M capabilities as retrofits
- Build self-monitoring and networking capabilities into new equipment
- Provide diagnostics, pre-failure warnings, download upgrades

Swagelok

The Robots are Coming

- The confluence of advanced technologies is bringing the age of robotics ever nearer
- Today's robots are smaller, cheaper, more practical and cost-effective
- Already chalking up major gains in the automation world
- Robots are "autonomous machines"
- Robots won't "look" like humans

Wireless networks

- Wireless sensor networks will provide vast arrays of real-time, remote interaction with the physical world
- Wireless connectivity is already wide spread in office and consumer environments
- Industrial automation is moving quickly to take advantage of the overwhelming benefits.

Wireless Technology Choices

- A bewildering variety of technology choices are available for factory and process installations
- Significant growth expected
- New wireless connectivity paradigm
- The implications are revolutionary

Industrial Automation Wireless

- **Not** just “cobbled together” commercial products
- Not just incremental “wire replacement”
  - Totally new applications
- Security is a key issue
- Standards are important

Standards in a fast-changing environment

- Standards are intrinsically difficult to implement and adopt – especially when technology is accelerating.
- If a standard is available, it's usually for old technology.
- This is the subject of our next presentation – "The Importance of Standards"

What is a “standard”?

- The definition of a "standard" is simple: operating specifications that everybody follows
- Standards provide openness and interoperability between products from different vendors.

Who benefits from standards?

- End-users are the primary beneficiaries of standards
- However, few users are large enough, or strong enough, to demand and set horizontal standards
- Suppliers gain the advantage from their own proprietary standards

Who drives standards?

- Standards are intrinsically difficult to implement and adopt.
  - End-users cannot drive standards
  - Supplier involvement compounds the confusion.
  - Conflicting objectives continue to cause endless debate
- Someone has to be the leader, to develop the standard that others follow.

Swagelok

Conflicting standards

- Conflicting standards have bad effects for everyone.
  - Customers get confused and postpone purchases to see how the market settles.
  - Suppliers limit development investments in products that may end up on the losing side of the conflict.
  - Growth is inhibited and the market becomes fragmented.

The standards dichotomy

- *The basic cause of all the fuss*
  The Users want an Open bus
  They push and threaten, beg and plead
  "Interoperable" is what they need
  The widgets made by Vendor A
  With Vendor B must plug and play

- *The Vendors swear they all agree*
  But just can't bear to make it free
  An open door will throw away
  Their value-core and make it gray
  Proprietary will be gone
  To hordes of hungry hangers-on

  - Jim Pinto Poem: "Open Saysame, Closed saysayou"

Swagelok

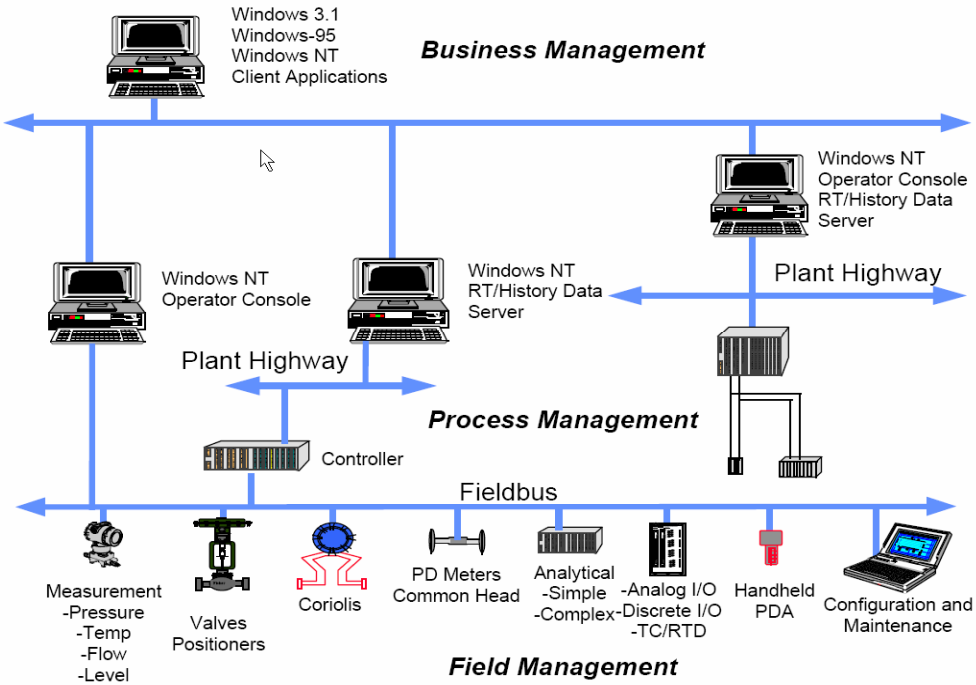
Pinto's Law of Open-systems Confusion

C = P x V / U

- where :
  C *is the Confusion*
  V *is the number of Vendor's supporting a "standard"*
  U *is the number of happy Users*
  and
  P *is Pinto's Confusion-factor, which decreases non-linearly with time*

Swagelok

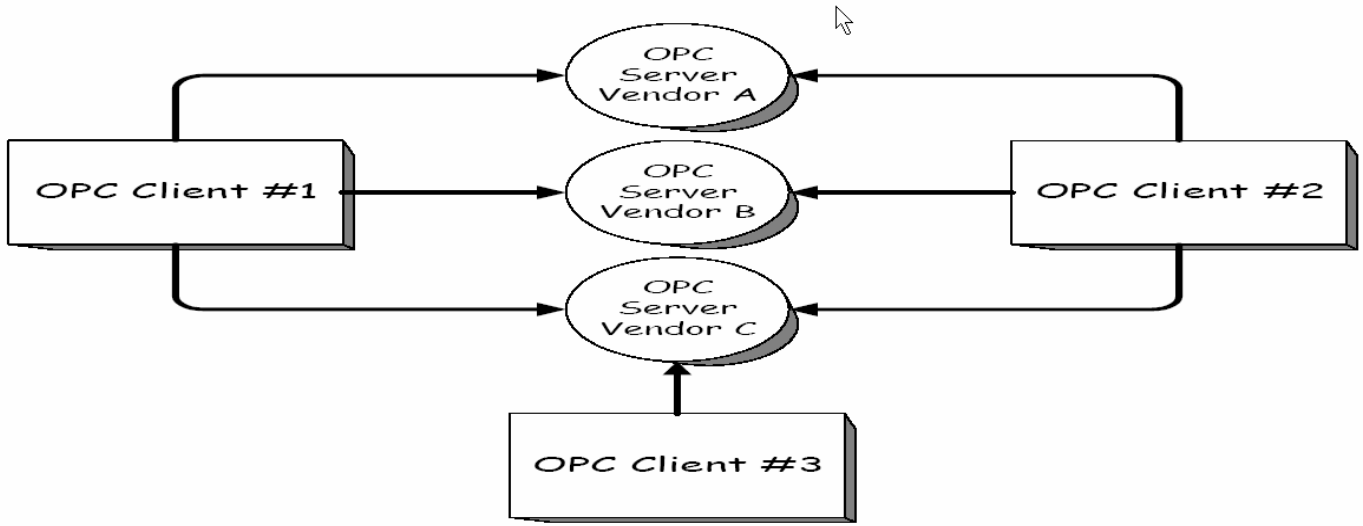
Industrial Products Hierarchy



OPC open connectivity - via open standards

- OPC is open connectivity in industrial automation and enterprise systems.
- Interoperability is assured through the creation and maintenance of open standards specifications.
- Over 400 companies are OPC Members

Multi-vendor connectivity



Swagelok

OPC Markets & Applications

- Industrial Automation
  - Process industry, Manufacturing, Acquisition and Transportation of Oil, Gas and Minerals
- Production devices
  - Sensors, instruments, PLCs, RTUs, DCSs, HMIs, historians, trending subsystems, alarm subsystems, and more

Related Links

- Cheaper, Faster, Better - The Productivity Race: http://jimpinto.com/writings/productivityrace.html
- The Robots are Coming: http://jimpinto.com/writings/industrialrobots.html
- The Pervasive Internet & its effect on industrial automation: http://jimpinto.com/writings/pervasive.html
- Network Choices - the Wireless Revolution: http://jimpinto.com/writings/networkchoices.html
- Pervasive Neworks: http://jimpinto.com/writings/pervasivenetworks.html
- OPC Foundation: http://www.opcfoundation.org/
- JimPinto.com: http://JimPinto.com

Swagelok