

Benefits of Open Source Hardware In Industrial Automation

Scope

This aim of this brief is to make the reader aware of recent developments in the open source hardware movement that can be leveraged for industrial processes control and to the benefit of the organization choosing to use these advances.

Author

This brief was prepared by Jacob Christ from pontech.com. PONTECH is engaged in the development and resale of Open Source Hardware solutions for industrial automation.

History

Programmable Logic Controllers (PLC)

Since the late 1960's the Programmable Logic Controller or PLC, which was created to speed up changeover of automotive production lines, has been the computational work horse of industrial automation. Most PLC's are proprietary systems created by a single vendor.

http://en.wikipedia.org/wiki/Programmable_logic_controller

Open Source Software

The Open Source Software movement began in the 1980's with software engineers using their free time to create useful programs that were then distributed at low or no cost to the user. Additionally, the code used to create these programs is open for anyone to view and improve. The result is sophisticated software at no cost to the user. The poster child of this movement is the web server. Today more than 80% of the worlds web servers are based on open source software (W3Techs.com, 1 July 2014).

http://en.wikipedia.org/wiki/History_of_free_and_open-source_software

Open Source Hardware

In the late 1990's an idea started to take hold inspired by the Open Source Software movement but applied to hardware. Hardware, in this case, is typically an electronic circuit or mechanical device. Unlike open source software, to realize the use of such device it has to be built.

<http://www.oshwa.org/research/brief-history-of-open-source-hardware-organizations-and-definitions/>

Today

New software and devices are starting to appear that have a PLC form factor but utilize the ideas of Open Source Software and Open Source Hardware. This in turn enables the creation of industrial processes based on open solutions.

<http://quick240.com/quickstart>

<http://startingelectronics.com/projects/large-open-source-PLC/>

<http://www.openapc.com/>

Conclusion

Utilizing open technologies for industrial processes provides both short and long term benefits to users in the following ways.

Immediate Benefits

- Lower equipment costs: Since organizations selling open hardware participated in a larger group of volunteers the cost to create a new product is lower and savings are passed on.
- No hidden features or bugs: If a problem is found with the equipment and the manufacture does not wish to fix the issue the organization is not handcuffed.
- Second sourcing: No need for second sourcing since the designs are open.
- Community: A community of corporations and users provide extended support beyond what a traditional closed systems can offer.
- Talent: A larger community of individuals concentrated around a common set of open standards means there is a larger pool of possible talent familiar with the technology choice. This makes it easier for a manager to find the talent capable of building equipment today and repairing or maintaining equipment in the future.
- Flexibility: Open systems are flexible and can be easily expanded in way that closed systems are not by either directly by the user or by third parties. Both hardware and software can grow with business needs. In contrast it is usually difficult to extend capability or add new, highly custom features to a closed proprietary system.

Long Term Benefits

- Extended Life: When a proprietary PLC is discontinued by the manufacture it means that old equipment cannot be maintained. Open systems when discontinued by a specific manufacture have all documentation open, so much so that it can even be reproduced by a third party.
- Reuse: When equipment is decommissioned, usable hardware that may have previously been discarded can more easily be reused due to a reduction in the barrier of finding adequate documentation.