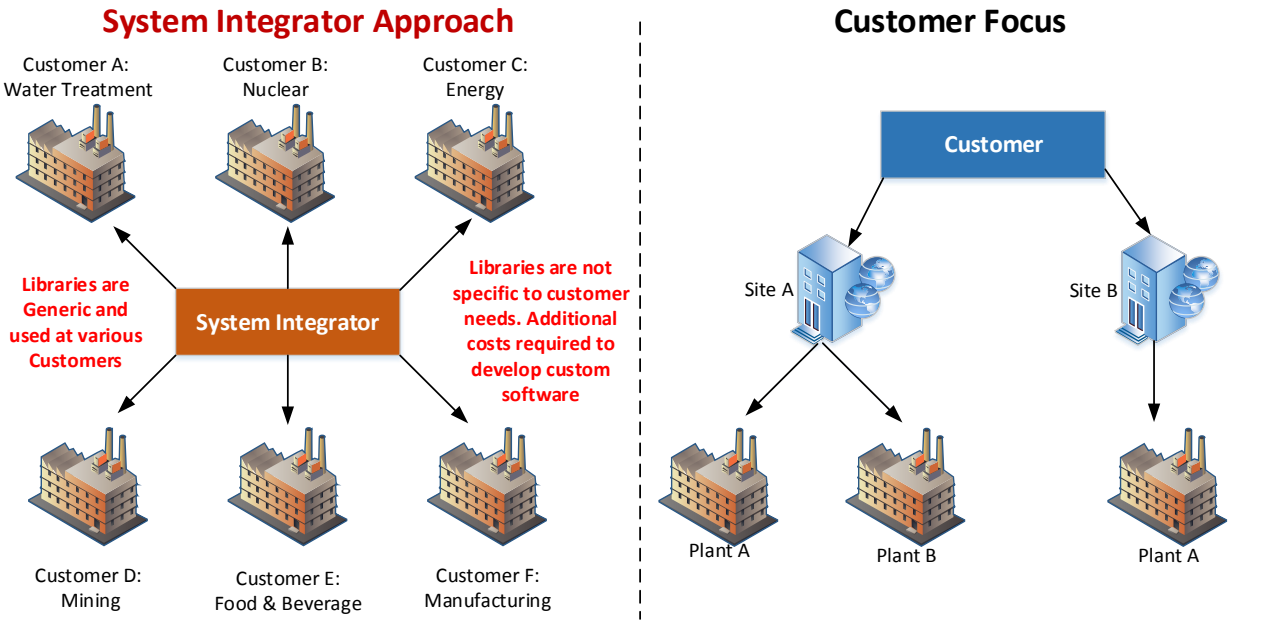
ATT: **Engineering Manager**

RE: THE VALUE OF "SOFTWARE LIBRARY DEVELOPMENT (Software Standards)" FOR YOUR PLC & SCADA SYSTEMS

To whom it may concern, Architects Integrating Industry (Ai2SA) hope to prove to you why it is beneficial to consider developing **Software Library Development** for **PLC** and **SCADA** systems to save on costs associated with software design and improve on functionality (value add).

Preamble

Traditionally, PLC and SCADA projects are awarded to System Integrators(SI) with no software libraries or libraries with limited functionality. Multiple projects over time are initiated at different parts of the plant(s) and different SI's are used to complete works, resulting in, no uniform library. Maintenance of the plant would be cumbersome as different plant areas use same physical equipment but employ different software libraries. Savings of between **10% -25%** can be realized per project and up to **60%** (Depending on size of plant and plant areas) savings on Maintenance cost maybe realized.



SOFTWARE LIBRARY (Considering S88 and ISA 95) DEVELOPMENT MODEL

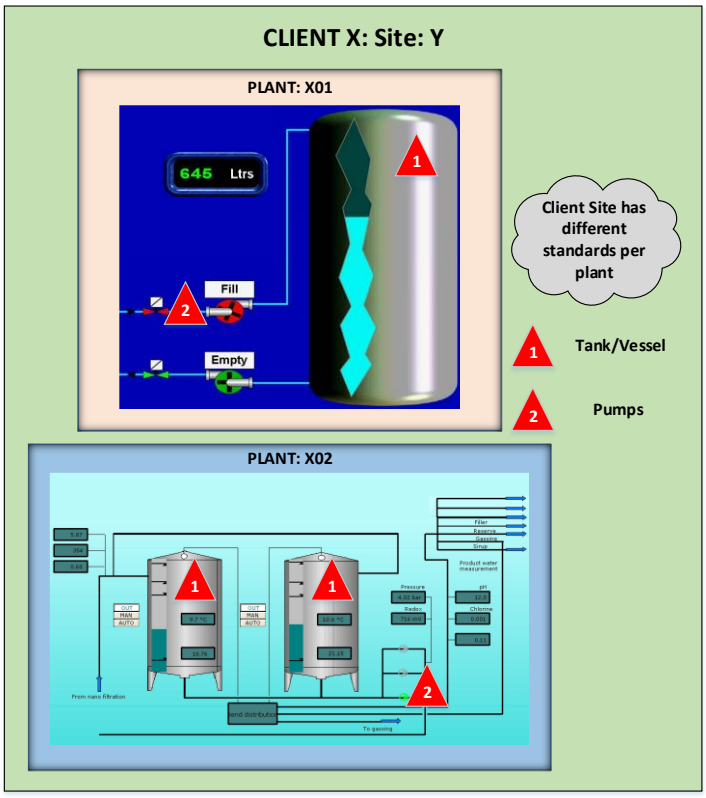
The Development of Software Libraries will ensure that software throughout the plant is of the same standard. The standard will ensure the Reusability, Modularity and Reliability of the software which in turn will result in cost savings in terms of Engineering effort.

From experience in managing of automation of industrial systems, major cost on the project is lost due to Engineering of "Custom" software which OEM software libraries do not cover. When SI's are given software libraries to use for automation of a plant, the cost of merely parametrizing and configuration of the software costs less as opposed to engineering software.

Lessons from previous automation projects, show that the Project Scope deviates from the original objectives and clients want to use a migration project to standardize which results in re-engineering on migration time. This in turn results in delays and increase in costs.

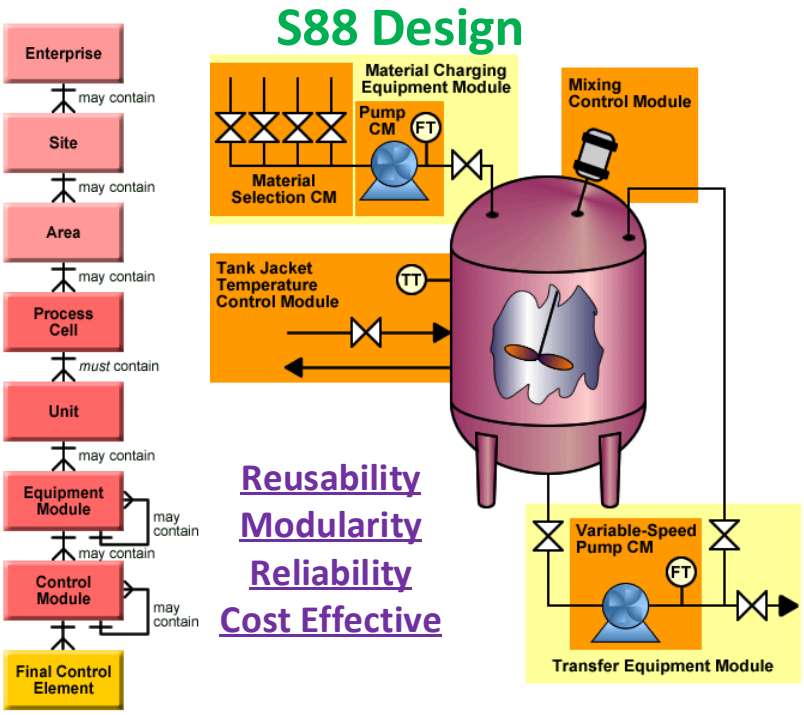
Benefits of Software Library Development:

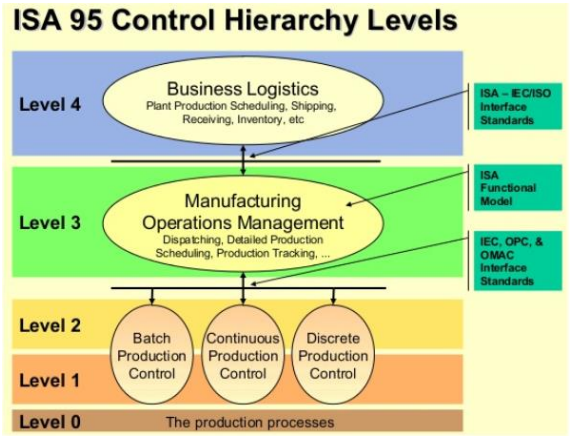
1. Consultation with all plant stakeholder on functionality of software.
2. Development of Software as a dedicated project.
3. Additional Functionality can be Engineered as per custom request.
4. Extensive FAT testing can be conducted to ensure conformance of functionality.
5. Reusability of signed off software library throughout the plant(s).



By considering S88, which is a design philosophy helping reducing time needed to reach full production levels or a new or existing system, improve reliability of operations, reduce the automation life cycle costs of batch processes and lowering initial costs of automating your operations. S88 Standard also allows the reusability of software which reduces the engineering effort in automating operations.

ISA 95 is a multi-part, international standard for the integration of enterprise and control systems. Level 4 have applications like supply chain management (SCM) or customer relationship management (CRM). Level 3 can also contain applications such as laboratory information management systems (LIMS). Levels 1 and 2 contain your classic control systems, and Level 0 is the physical equipment.





Source: 3rd Party Graphics

Customers usually invest some time in developing software libraries when initiating a project. This is normally the 1st step of a project if specified up-front to the SI's. The development of libraries on a project will increase costs and usually if the customer has no Software Libraries the SI's will use their libraries for the project.

Ideally the Customer would want to **"Free Issue"** the Libraries for the SI's to implement on the project. Here the Saving is with Customer as there will be significant less development and engineering costs added to the project. Of course there should be some clarification costs but as illustrated on the side:

PLC & SCADA Labour	Factor	Saving
Clarification (Risk Assessment)	80%	**20%**
Clarification (Technical Content)	50%	**50%**
Specification	0%	**100%**
Reverse Engineering	0%	**100%**
Functional Design Specification	0%	**100%**
Thin Slice (PLC & SCADA)	0%	**100%**
Hardware Design	20%	**80%**
Device Design	0%	**100%**
Programming & Simulation	25%	**75%**
Commissioning	85%	**15%**
FAT Testing	85%	**15%**
Documentation	50%	**50%**
Sub-total		

Risk Mitigation is performed due to stringent Factory Acceptance Testing (FAT).

The reality is that this saving traditionally went to the SI as profit due to the fact that they would re-use their own standards. The limitation in that is that it is more of the same and does not move with technology and as such offers no new value-add.

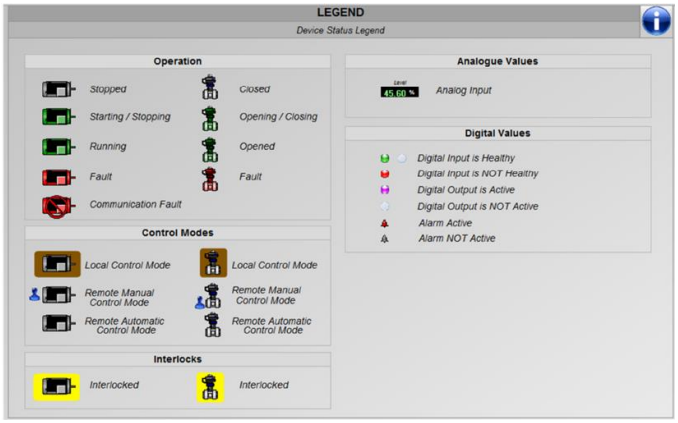
Ai2SA adopts sound Project Management principles to execute the development of Software Libraries for customers, ensuring that all key stakeholders are involved in the Clarification, Design, Development and Sign Off Phases.

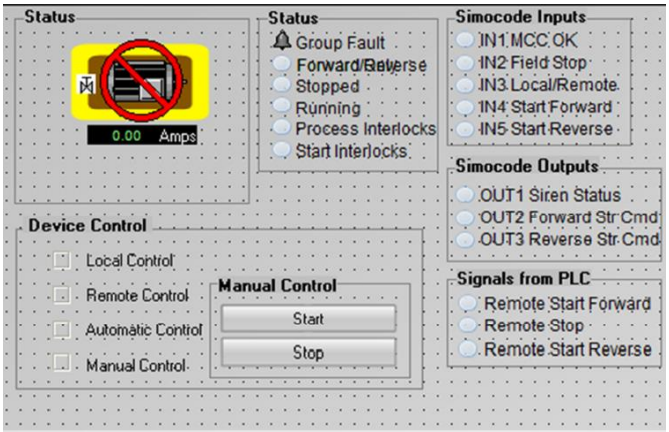
An example below illustrates a proposal where a customer requires a development of software (PLC & SCADA) where the customer has no libraries:

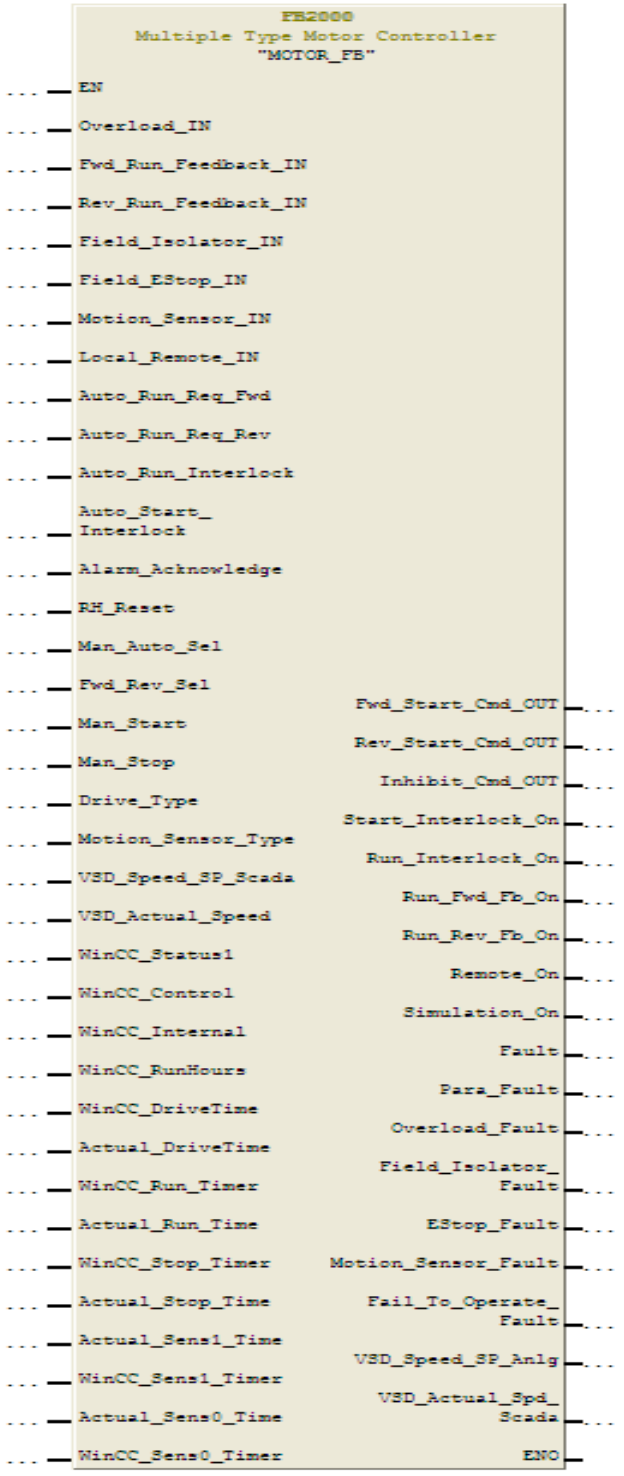
PLC Labour Cost	No Libraries	With Libraries
Clarification (Risk Assessment)	R 1 500.00	R 1 500.00
Clarification (Technical Content)	R 2 500.00	R 1 250.00
Functional Design Specification	R 5 000.00	R -
Hardware Design	R 2 500.00	R 2 000.00
Device Design	R 6 800.00	R -
FAT Testing	R 2 200.00	R 1 870.00
Documentation	R 1 500.00	R 750.00
Sub-total	***R 22 000.00***	***R 7 370.00***
Electrical Labour Cost		
Clarification	R 1 500.00	R 1 500.00
Wiring Diagrams	R 2 800.00	R 2 800.00
As-Built Drawings	R 1 500.00	R 1 500.00
Sub-total	***R 5 800.00***	***R 5 800.00***
SCADA Labour Cost		
Clarification	R 1 500.00	R 1 500.00
I/O Device Tags	R 6 500.00	R 5 200.00
Database Alarms	R 2 800.00	R 2 240.00
Template + Navigation Design	R 1 000.00	R -
Project Assembling	R 1 500.00	R 1 500.00
FAT Testing	R 2 200.00	R 1 870.00
Sub-total	***R 15 500.00***	***R 12 310.00***
Misc Labour Cost		
PM & Consulting	R 2 500.00	R 2 500.00
Project Overheads	R 3 000.00	R 3 000.00
Sub-total	***R 5 500.00***	***R 5 500.00***
NETT SELLING PRICE	**R 48 800.00**	**R 30 980.00**
VAT @ 14%	**R 6 832.00**	**R 4 337.20**
TOTAL PRICE	**R 55 632.00**	**R 35 317.20**
	SAVING	**37%**

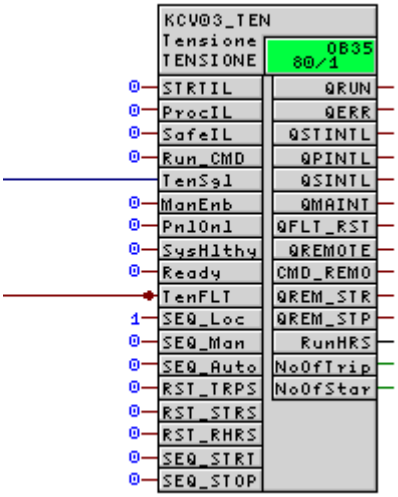
Savings are realized on the following Items (Clarification, FDS, Hardware Design, Device Design, FAT Testing & Documentation). A total of **37%** can be achieved. This example shows the cost effectiveness of the reusability and repeatability of the software libraries for all automation projects on the customers site.

Examples of Libraries Developed by Ai2SA:









Finally, some project references listing high level details of Software Libraries Development are depicted below:

#	Industry(s)/Sector(s)/Type(s)	Category	Region	Libraries Developed
1	Refinery	Refining	Gauteng	PLC
2	Chrome Mining, Smelting and Pelletizing & Sintering	Mining & Smelting	Gauteng	PLC & SCADA
3	Platinum Mine	Mining & Smelting	North West	PLC & SCADA
4	Manganese Mine	Mining & Smelting	Northern Cape	PLC & SCADA
5	Glass Manufacturing Plant	Glass	Gauteng	PLC
6	Chrome Processing Plant	Mining & Smelting	North West	PLC & SCADA
7	Drinking Water Treatment Plant	Water	Free State	PLC & SCADA
8	Nuclear Pharmaceutical	Nuclear	North West	PLC

Please feel free to contact the author should you require additional clarity re enclosed or require the "Development of Software Libraries" in order for us to quantify actual savings we believe may be realized.

Thank you kindly and kind regards,

Petrus Klopper
Managing Director