

Review of Honeywell LEAP™ & Honeywell LEAP™ for Operations project execution methods

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Abstract. The paper considers experience in accelerated system design and project execution using Honeywell LEAP™ approach based on universal I/O modules, standardized field cabinet unit and virtualization plus cloud-based engineering. All these methods can be used separately or combined within single project making execution (especially plant upgrades) smoother with less process disturbances and rework. This is very actual in the present time when pandemic of COVID-19 revealed how vulnerable are chain of supply especially when cargo/shipment from abroad involved.

1 Introduction

Traditional methods of project design and execution use a sequential or cascade order of project stages execution, so called “waterfall” model - the key parameter in this case is the creation of a project structure (breaking down one large goal into smaller tasks) and a schedule for the execution of the planned stages.

As the simplest and most generalized example of such kind of planning can be considered the construction of a residential building - first step is project documentation preparation and harmonization, then budgeting which is determine execution / construction costs will be carried out and, accordingly, the deadlines for the handover of the facility to the customer.

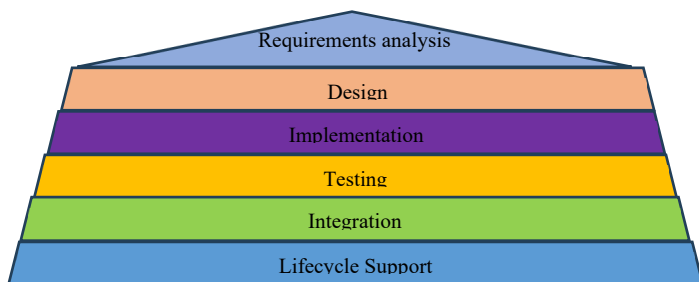


Fig. 1. Cascade or “waterfall” model of design.

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This model was finally formed in 19050s and has major disadvantage – when changes in key parameter at the late stages leads to significant rework and therefore throw the indicator of project readiness far back [1].

This is unacceptable especially in industrial areas where plant shutdown window is usually very tight – any unexpected delay may have huge consequences: financial, reputational, and even ecological. E.g., an oil refinery plant when it is running not in optimal mode does much more flaring than usual, that leads to increased emissions of CO₂, black carbon, and other pollutants. According to The World Bank GGFR program (Global Gas Flaring Reduction Partnership) despite that global gas flaring decreased “decreased to 139 billion cubic meters (bcm) in 2022 from 144 bcm in 2021. However, the world still flared enough gas to generate approximately 1,800 Terawatt hours (TWh) of energy” [2].

So, what more could be done to improve that? Answer is the Honeywell LEAP™ & Honeywell LEAP™ for Operations – outstanding approach in project design and execution.

2 Honeywell LEAP™ & Honeywell LEAP™ for Operations

2.1 Honeywell LEAP™

Honeywell LEAP™ - the innovative and proven project execution methodology to make improvement, optimization in ongoing industrial operations to achieve goals in efficiency, productivity, etc. [3].

The Honeywell LEAP™ includes three major components [4]:

- **Universal Channel Technology** – Honeywell’s proprietary solution based on new hardware version UIO (Universal Input/Output) modules and standardized input/output (system) cabinets, which allows reduction of number required IO modules (1 UIO instead of 4 different kind AI/AO/DI/DO), direct field devices wiring connection eliminate marshalling cabinets and reduce footprint.

UNIVERSAL PROCESS CABINET (UPC)

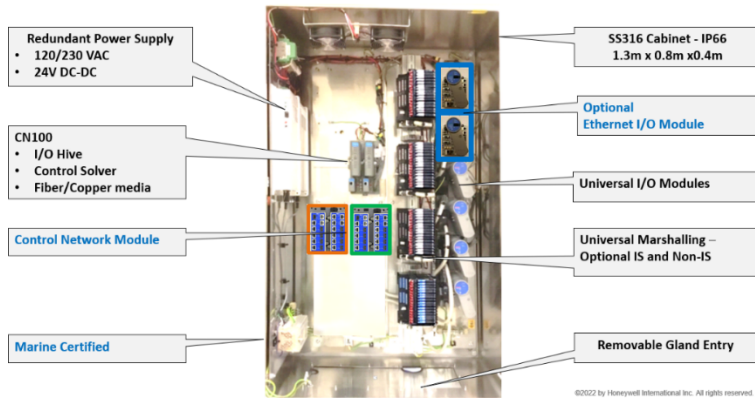


Fig. 2. Example of Universal Process Cabinet using UIO modules.

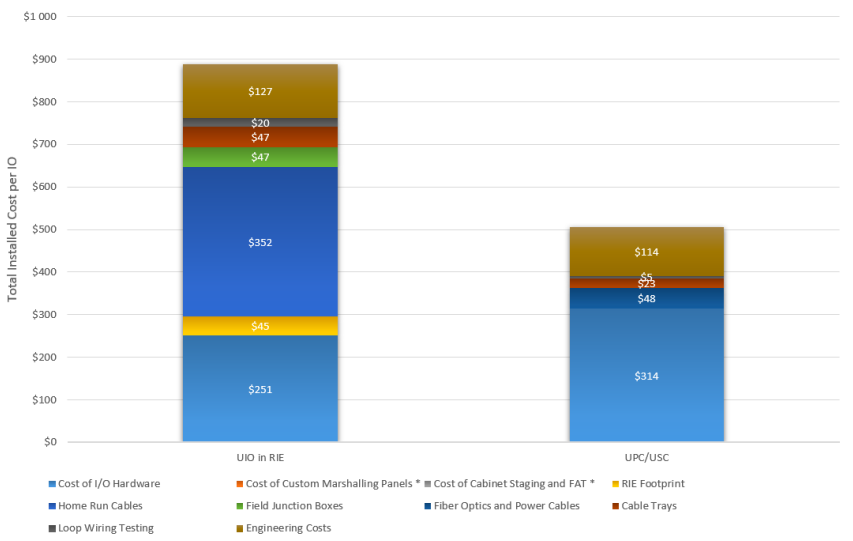


Fig. 3. RIE design vs RIE + Field UPC - CAPEX comparisons.

- Virtualization – Use of standardized server/client machines with typical configuration dedicated on the same host instead of variety of physical machines reduce hardware requirements as well as man-hours required for maintenance, probability of unplanned downtime. Overall space, power, cooling required for physical arrangement correspondingly reduces – leading to significant indirect savings.
- Cloud Engineering – allows design, implementation and testing of project of any complexity while using centralized (even located on customer’s site) cloud environment with in-built cybersecurity accessible from anywhere in the world, avoiding delays caused by travelling disruptions (like it was during COVID-19 pandemic time).

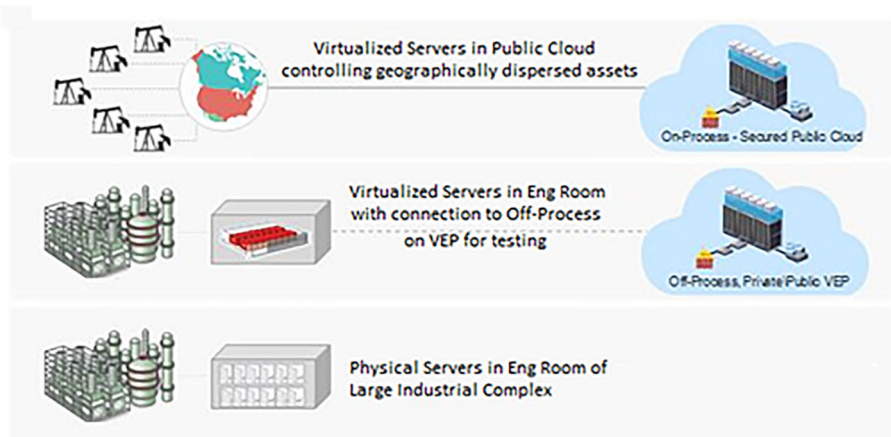


Fig. 4. Honeywell Multi-tiered Cloud Execution Environment.

2.2 Honeywell LEAP™ for Operations

Honeywell LEAP™ for Operations is based on Honeywell LEAP™ – but also including set of latest technology improvement solutions, such as:

- Automated Device Commissioning – Honeywell manufacturing SmartLine transmitters supporting both 4-20 mA HART and FOUNDATION fieldbus. OneWireless devices are fully compatible with WirelessHART and ISA 100.11 wireless protocols. By enabling the ADC option for example on Safety Manager controller those transmitters which are connected to it will be automatically detected - allowing end users to install and commission field devices before the actual control system software is deployed.

Experion I/O (regardless Series C or IO HIVE devices) automatically queries all I/O channels - intelligent transmitters are recognized automatically by the I/O. If the software configuration of the system matches with the discovered device – transmitter will be automatically added to the system. If there is any mismatch such as transmitter range, alarm setting, and so forth it can be uploaded to the intelligent transmitter in the field [5, 6, 7].

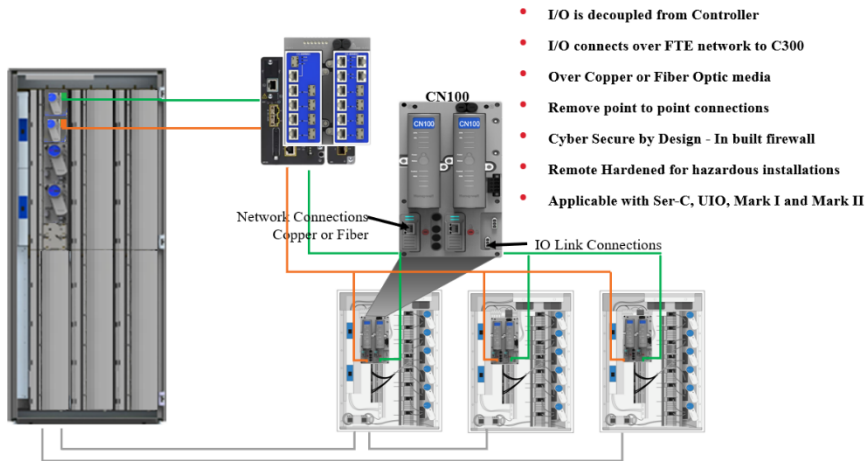


Fig. 5. Honeywell Experion PKS I/O HIVE solution.

Starting from the R500 release, Honeywell's Experion PKS software platform for industrial automation is having in-built new testing and documentation capabilities for intelligent devices: e.g., different percentages of range can be calibrated automatically using HART commands without using field calibrator – saving time and resources for other more critical tasks. Once adjustment and testing completed - test results are also automatically documented and a total cabinet printout report is available, so entire device commissioning process can be reduced to a couple of minutes, versus a couple of hours [7].

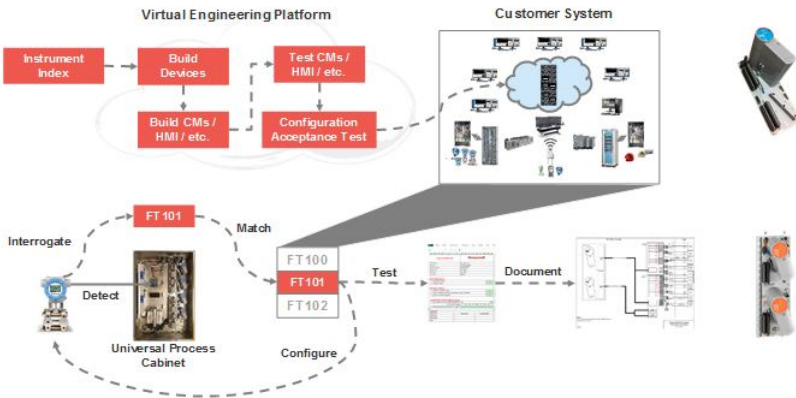


Fig. 6. Automated Device Commissioning including Automated Testing and Documentation.

- Universal Connected Assets - LEAP™ for Operations provides better connectivity to assets which do not belong to the process automation system directly, such as automated power monitoring systems (widely used IEC 61850 protocol-based supported by the Ethernet Interface Module), SCADA RTUs, third-party PLCs, etc. EIM also supports Ethernet/IP networks integration significantly simplifying connection of skid-mounted equipment, which is predominantly controlled by PLCs and can represent up to 50 percent of the I/O in a process plant. Additionally, ControlEdge PLCs and ControlEdge RTUs (formerly known as RTU 2020) firmware enhanced with autorecognition features that can significantly reduce configuration downtime [7].

TASK	TIME	BEFORE	AFTER	TASK	TIME
Map 100 variables	1 hr	3 rd party PLC / RTU 12 HOURS	Integrated ControlBoq PLC / RTU2020 15 MIN	Configure controller	5 min
Create channel and controller	15 min			Automatically generate and review points	10 min
Configure & validate points	5 hrs			Diagnostics configuration (Ready out of the box)	0 min
Diagnostics configuration	6 hrs			TOTAL	15 min
TOTAL	12+ hrs				

TASK	TIME	BEFORE	AFTER	TASK	TIME
Map 5 variables	5 min	3 rd party PLC / RTU 17 MIN	Integrated ControlBoq PLC / RTU2020 3 MIN	Automatically generate and review 5 points	2 min
Configure & validate points	10 min			Download points	1 min
Download points	2 min			TOTAL	3 min
TOTAL	17 min				

Fig. 7. Automated Configuration Capabilities vs Traditional Configuration of 3rd party PLCs.

- Industrial Cyber Security Risk Manager – this application collects information in a similar manner to traditional security information and event management (SIEM) products, but then converts this information into a dashboard that helps operators understand the extent of these risks ensures that operators are always aware and can direct cyber resources to areas that require immediate attention. Analysis capabilities help operators and cybersecurity personnel quickly isolate risks to specific devices [7].
- Conformance to Cybersecurity Standards - Honeywell Experion C300 controller, Safety Manager, and FIM controllers are certified ISASecure Level I. In January of 2017, Honeywell also received ISASecure SDLA lifecycle certification, based upon the IEC 62443 industrial cybersecurity standard.

3 Conclusion

Any of the Honeywell LEAP™ or Honeywell LEAPT™ for Operation features are very effective improvement by itself, but their combination drives significantly more – e.g. according to Jack Gregg, director of Experion product marketing at HPS, “the benefits in one case study involving just Universal IO and virtualization:

- Reduced MAC cabinets by 50 percent.
- Reduced marshaling cabinets by 90 percent (at \$10,000 per cabinet).
- Reduced cabinet engineering, drawings and documentation, saving up to \$1 million.
- Reduced opportunities for marshaling mistakes by 66 percent.
- Reduced capital cost by approx. \$16 million (in a normalized \$50 million MAC scope) – up to 30%”.

Adding to this capability to reduce project schedule by 16 weeks and there will nothing to be mentioned more before recommend Honeywell LEAPT™ or Honeywell LEAPT™ for Operation features to be used for plant upgradation and/or optimization projects in Uzbekistan, regardless of area of implementation. Uzbekistan maintains sustainable rate of development in industrial automation, oil refinery & gas processing as well as in mining & extraction therefore to keep this rate as high as possible modern and efficient technologies and approaches to be used. Uzbekistan already has a great experience in collaboration with lead commercial and non-commercial organizations (such as World Bank, etc) and companies (LOTTE Chemical, Lukoil, etc) related to process automation, so Honeywell is also one of them and very proud to be proven partner of Uzbekistan for about 30 years.

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