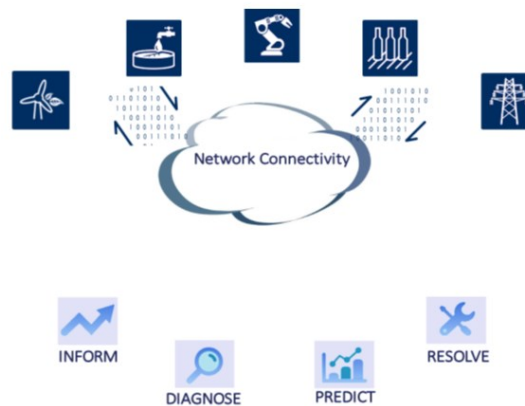


## Remote Data Collection and Reporting for IoT

### Overview

Collecting and analyzing data from remote locations has significant savings in cost and resources. With this capability, a machine builder is able to perform proactive maintenance on their equipment without the expense of travelling to site. A production facility can calculate the effectiveness of their production facilities periodically and automatically.

In this document we describe a simple but very effective way of collecting and reporting on data from remote locations. The solution is a result of a partnership between SyTech and HMS Networks.



### Beyond Remote Access



HMS Networks produce the Ewon Flexy hardware. It is a leading solution for secure remote access to process equipment using the Talk2M VPN which is also provided by HMS. Using the VPN tunnel, users can perform tasks like troubleshooting problems or changing ladder logic in a PLC.

The Flexy also provides methods to access data from the process. This can be live data using a direct connection or historical data using the Talk2M service.

#### Live Data

The Flexy provides data drivers for leading PLC manufacturers like Rockwell Allen-Bradley, SIEMENS, Mitsubishi and many more. It is also compatible with proprietary HMS IO technology, and open data standards like OPC UA and MODBUS. Multiple IO drivers can be used in conjunction, and thousands of tags can be defined. This interface allows the flexy to act as a data server for the process equipment to which it is connected.

**XLReporter** accesses the instantaneous tag values using the OPC UA server provided on the device. This server can be protected by security features that allow secure authentication of the UA connection and the ability to limit the tags which are accessible by UA clients.

#### Historical Data

The Flexy can historize process and alarm data and make it available in the Talk2M service. For process history, a flexible logging configurator is offered, allowing tag value collection on time using deadband and scaling as well as collecting process alarms using up to 4 alarm thresholds. For advanced logging, a BASIC scripting environment is provided.



**XLReporter** uses the steady stream of historical data from the Talk2M to produce informative reports.

### Talk2M Setup

To create a Talk2M account use eCatcher, a free application provided by HMS. This account also associates the historical data logged on each Flexy device to a centralized database in the cloud called the DataMailbox. This is protected by the same security as the VPN tunnel.

The data inside the mailbox is only retained for a 10-day period and then the oldest is overwritten. **XLReporter** ensures that the information has been consolidated in “long term” storage before the data is overwritten.

## Beyond Reporting

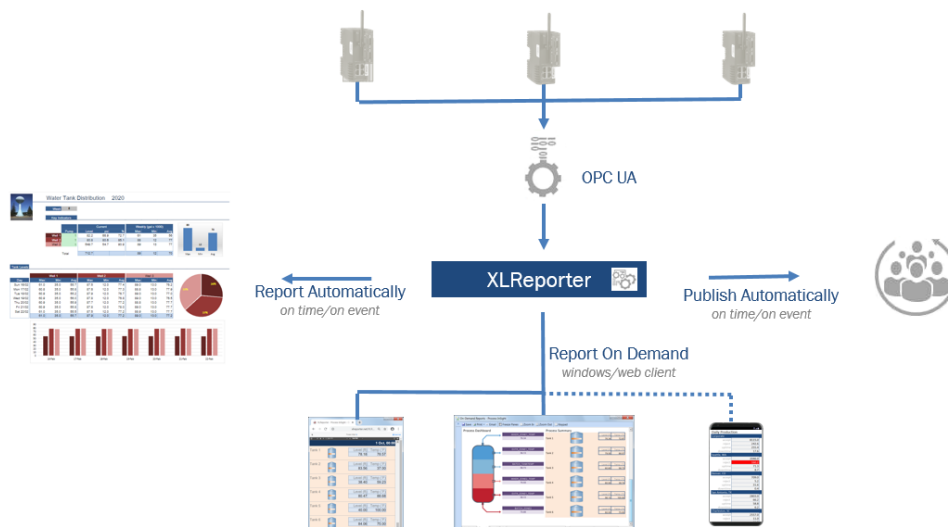
As was described in a previous section, there are two scenarios where the Ewon Flexy can be leveraged to generate process reports from connected machine data.

In the first scenario, a live connection to the Flexy provides personnel with reporting and analysis using data collected from the local process machinery.

In the second scenario, a historical connection to the Flexy provides personnel reporting and analysis on one or more machines that are located remotely from the people who require the reports.

In both these scenarios, **XLReporter** offers powerful features to access and report on the process data.

### Scenario 1 – Local Data



In this scenario, the process equipment is connected to the Ewon Flexy LAN and tagged values are exposed to the OPC UA server on the device. **XLReporter** is installed on a windows computer (which can be an industrial micro-PC) that is also connected to the Flexy's LAN. **XLReporter** then continuously monitors the live tag values to generate either On-Demand dashboards or automatic reports using "Report as You Run" technology. Access to the reports is provided in the form of workbook files, PDF, or through a live web portal that is optimized for both desktop and mobile devices.

## Scenario 2 – Remote Data



In this scenario, the DataMailbox provided by the Talk2M is used to consolidate the data from a collection of Flexy devices located in remote, and possibly different, locations. **XLReporter** uses the Talk2M credentials to access the mailbox, and then synchronizes the data automatically to a permanent database based on a timed schedule, such as every hour, every day, and so on. The data is organized by timestamp and by device, so reports can span any time period, as well as any or all the devices associated with the DataMailbox.

## Why XLReporter

While the Ewon Flexy provides all of the tools necessary to collect process data either on the device's LAN, or remotely through the DataMailbox, data alone does not have much value unless it is accessible and understandable. With **XLReporter**, the raw data collected by the Flexy is transformed into actionable information that is delivered to the right people, at the right time.

- Reports can be driven based on a time such as capturing a turbidity value every 15 minutes.
- Reports can be driven on events such as during a Clean-In-Place cycle.
- Designing reports is intuitive because **XLReporter** uses workbook concepts to design reports which include features such as formula, format and charts. If a user knows Excel then they will know **XLReporter** and be able to apply their existing skills immediately.
- The template wizard of **XLReporter** gets user productive in a matter of minutes.

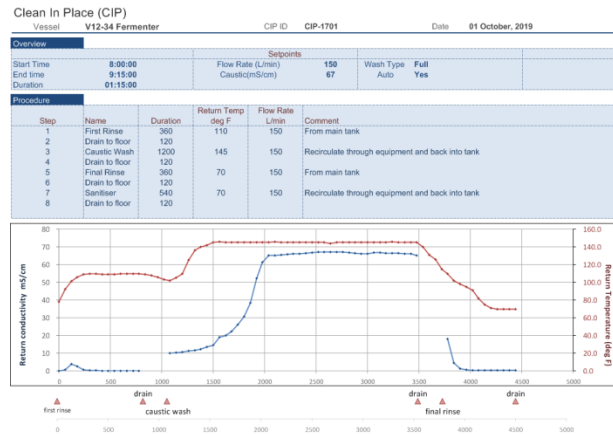
# Case Studies

## Machine Cycle Report Requirement

In the food industry, equipment is often cleaned without dismantling. A “Clean In Place” report is required during the cleaning process which needs to be saved for auditing purposes.

### Solution

This is an example of a discrete report where process events determine when the report is created and when it is updated. The scheduler monitors the “Start CIP” event to create the report, naming it with information read from the PLC such as a *CIP ID*. The report is then updated periodically, appending a new row of data, until the “End CIP” event occurs.



## Corporate Production Report Requirement

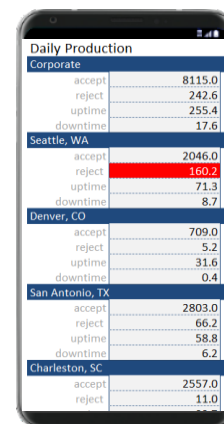
An animal feed manufacturer has several production facilities located around the world. The corporate management and engineers require up-to-date information comparing production across sites in order to optimize equipment utilization and meet business goals.

### Solution

An Ewon Flexy, installed at each facility, collects production totals and machine performance indicators and uploads the information periodically to the Talk2M DataMailbox. **XLReporter**, located at the manufacturer’s main office consolidates the data in the DataMailbox to a SQL Server database.

Every day a production report for each facility is produced automatically, including information from other sources, and is accessed by management and process engineers using the **XLReporter** web portal.

Daily Corporate Production							Date : March 4, 2019			
Corporate Summary							Accept	Reject	Uptime	Downtime
							x1000 lbs	x1000 lbs	hrs	hrs
Total							8115	242.6	255.4	17.6
Seattle, WA							2046	160.2	71.3	8.7
Denver, CO							709	5.2	31.6	0.4
San Antonio, TX							2803	66.2	58.8	6.2
Charleston, SC							2557	11.0	93.7	2.3
Location	Facility	Ewon ID	Production		Runtime					
			Accept	Reject	Efficiency %	Uptime	Downtime	Efficiency %		
			x1000 lbs	x1000 lbs	%	hrs	hrs	%		
Seattle, WA	Clyde Hill	WA-S01	477	1.5	100%	16.0	0.0	100%		
	Tarrow Point	WA-S02	214	145	60%	8.2	7.8	51%		
	Mercer Island	WA-S03	465	1.1	100%	15.8	0.2	99%		
	Iassaquah	WA-S04	469	9.4	98%	15.3	0.7	96%		
	Kirkland	WA-S05	421	3.2	99%	16.0	0.0	100%		
Total			2046	160.2	93%	71.3	8.7	89%		
Denver, CO	Holly Hills	CO-D01	324	1.7	99%	15.9	0.1	99%		
	Highlands Ranch	CO-D02	385	3.5	99%	15.7	0.3	98%		
Total			709	5.2	99%	31.6	0.4	99%		
San Antonio, TX	Olmos Park	TX-S01	724	1.1	100%	15.8	0.2	99%		
	Alamo Heights	TX-S02	717	3.5	100%	15.9	0.1	99%		
	Shavo Park	TX-S03	651	56.9	92%	11.4	5.6	67%		
	Beckmann Quarry	TX-S04	711	4.7	99%	15.7	0.3	98%		
Total			2803	66.2	98%	58.8	6.2	90%		
Charleston, SC	Grimball Gates	SC-C01	417	1.7	100%	14.9	1.1	93%		
	Harleston Village	SC-C02	424	2.1	100%	15.8	0.2	99%		
	Stiles Point	SC-C03	419	2.5	99%	15.4	0.6	96%		
	West Ashley	SC-C04	459	1.5	100%	16.0	0.0	100%		
	Summerville	SC-C05	426	1.9	100%	15.9	0.1	99%		
	Mount Pleasant	SC-C06	412	1.3	100%	15.7	0.3	98%		
Total			2557	11.0	100%	93.7	2.3	98%		



# Maintenance Report

## Requirement

A filter machine manufacturer needed to monitor the operation of their equipment at their customer facility in order to gain a better understanding of their operation in a “real world” setting. This information is used for proactive maintenance and emailed to the customer every week.

## Solution

An Ewon Flexy, installed at each facility, collects production totals and machine performance indicators and uploads the information periodically to the Talk2M DataMailbox. **XLReporter**, located at the manufacturer’s main office consolidates the data in the DataMailbox to a SQL Server database.



### Weekly Manufacturing Status

Location Holy Hills, Denver, CO      Week Start April 28, 2019  
 System Filtration      Week End May 4, 2019  
 Model X11-45C

Differential Pressure (psi)				Aux Zone 1 (°F)				Aux Zone 2 (°F)			
Date	Max	Min	Avg	Date	Max	Min	Avg	Date	Max	Min	Avg
04/28/19	746.58	603.26	671.56	04/28/19	198.0	150.4	169.4	04/28/19	191.73	153.20	173.45
04/29/19	819.17	608.79	703.37	04/29/19	199.0	150.1	174.7	04/29/19	198.83	150.21	169.80
04/30/19	785.68	611.77	696.88	04/30/19	199.5	150.6	172.2	04/30/19	197.87	151.57	175.18
05/01/19	805.02	608.04	703.35	05/01/19	198.2	155.4	178.8	05/01/19	199.92	150.06	170.66
05/02/19	796.44	603.10	693.54	05/02/19	199.0	151.4	176.5	05/02/19	198.33	150.53	172.21
05/03/19	795.08	603.53	691.36	05/03/19	199.0	151.4	179.3	05/03/19	199.01	153.91	177.10
05/04/19	824.77	603.62	691.60	05/04/19	199.5	154.4	178.5	05/04/19	198.29	150.87	171.87

Events				Flow (gals)			Production (lbs)				
Date	Recycle	Refill	Vibrate	Date	Pump 1	Pump 2	Total	Date	Accept	Reject	%
04/28/19	2	1	1	04/28/19	39,303	29,564	68,868	04/28/19	2266263	67988	97.00%
04/29/19	2	1	1	04/29/19	38,086	35,130	73,217	04/29/19	2281515	68446	97.00%
04/30/19	2	2	2	04/30/19	37,893	29,986	67,879	04/30/19	2269081	68074	97.00%
05/01/19	2	0	0	05/01/19	36,920	33,584	70,504	05/01/19	2218040	66542	97.00%
05/02/19	2	1	1	05/02/19	36,627	34,164	70,790	05/02/19	2136579	64097	97.00%
05/03/19	1	1	1	05/03/19	37,488	33,862	71,350	05/03/19	2286651	71498	96.87%
05/04/19	1	1	1	05/04/19	39,537	33,975	73,511	05/04/19	2040627	61217	97.00%



Good Morning Team,  
 Enclosed is [HollyHills-2019-04-28.pdf](#)

Faults and Alarms		
Date	Code	Fault Description
3/3, 09:17	217	Pump 1 low flow
3/3, 09:35	204	Pump Station Pump #2 fault
3/7, 10:30	631	Low air pressure PS-12
3/7, 11:07	305	ORP-01 signal invalid
3/7, 11:08	415	Aeration Tank Ph below 6
3/7, 11:08	417	Aeration Tank pH signal invalid