

18 NIAGARA SUMMIT

CONNECTING THE WORLD

Niagara 4 TCP Advanced Training

Damon Riddell Senior Training Engineer



Problem?

- Need to compare multiple data and give result report
- Need logic to be dynamic





Solution!

• Series Transforms





Series Transforms

- Composite Node
- Aggregate Node
- Rollup Node
- TimeShift node





Series Transforms

- Composite Node
- Aggregate Node
- Rollup Node
- TimeShift node





Series Transform

Composite Node

🏰 Niagara Workbench		– 0 ×
File Edit Search Bookmarks Tools Window	Wire Sheet Help	Q Quick Search
	F 『 『 『 『 み る i ங × っ /	
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : St	ation (N4ADV00) : Config : SeriesTransform : CompositeTransform	🖍 Wire Sheet 👻
- Nav	Wire Sheet	
Le O 🗙 🕲 My Network		
	Richmond_VA Composite I Terminal Composite Composite Node E Terminal Inde	8
Gervices More and the services Orivers	History Source Node Composite Node Transform (Jouts schema (dk) Transform inputs schema (dk) Transform Nutput schema (dk) Transform Nutput schema (dk) (dk)	
Apps	Status (ok) Status (ok)	
Schedules		
Power	Henrico_VA History Source Node	
▶ Q Ventilation	Transform Inputs schema (ok) Transform Output schema (ok) Status	
Structures Reporting	Data Source history:/N4ADV00/	
Reporting SeriesTransform	Coolham_UK	
O HistoryPoints	History Source Node Transform Inputs schema [ok]	
CompositeTransform	Transform Output schema (ok) Status (ok)	
Files	Data Source history:/N4ADV00/	
Hierarchy	Beijing_CN History Source Node	
History	Transform Toputs schema (ok) Transform Output schema (ok)	
	Status (ok) Data Source history:/N4ADV00/	
• Palette		
TransformGraph		
HistorySource		
		, , , , , , , , , , , , , , , , , , ,





Series Transform

Composite Node

File Edit Search Bookmarks Tools	Window	Help							
	<u>i</u>	- 🗆 🖪 🖪 🗗	× @ 🖞 🖣	XIC					
tost:VA51LTG1C62H2.global.ds.honeywell.com(N4ADV	/00) : Stat	ion (N4ADV00) : Config	: CompositeTransform	n : transform:slot:/Se	eriesTransform/CompositeTran	sform	1	Collection [·]	
Nav	2							166 r	ro
		timestamp	Henrico_VA_value (kW)	Beijing_CN_value (kW)	Richmond_VA_value (kW)	Coolham_UK_value (kW)			
My Network		08-Apr-18 10:28:00 AM EDT	1756.4 kW	1534.0 kW	1028.2 kW	1367.8 kW			
Services	^	08-Apr-18 10:42:59 AM EDT	1066.9 kW	1641.2 kW	1349.8 kW	1765.7 kW			
Drivers		08-Apr-18 10:57:58 AM EDT	1117.0 kW	1894.7 kW	1263.9 kW	1695.1 kW			
Apps		08-Apr-18 11:12:57 AM EDT	1746.6 kW	1431.9 kW	1588.8 kW	1299.1 kW			
 C Schedules E Power 		08-Apr-18 11:27:56 AM EDT	1367.9 kW	1742.6 kW	1943.8 kW	1397.2 kW			
Q Ventilation		08-Apr-18 11:42:55 AM EDT	1049.3 kW	1992.6 kW	1484.3 kW	1385.1 kW			
Structures	- 11	08-Apr-18 11:57:54 AM EDT	1982.9 kW	1050.7 kW	1364.4 kW	1928.1 kW			
Reporting	- 11	08-Apr-18 12:12:53 PM EDT	1903.5 kW	1315.1 kW	1971.0 kW	1555.5 kW			
 SeriesTransform 		08-Apr-18 12:27:52 PM EDT	1393.8 kW	1546.2 kW	1634.3 kW	1505.9 kW			
HistoryPoints	- 11	08-Apr-18 12:42:51 PM EDT	1338.8 kW	1461.8 kW	1295.7 kW	1732.7 kW			
CompositeTransform	- 11	08-Apr-18 12:57:50 PM EDT	1380.0 kW	1085.0 kW	1215.7 kW	1994.3 kW			
 Files Hierarchy 	- 11	08-Apr-18 1:12:49 PM EDT	1400.7 kW	1606.3 kW	1516.3 kW	1598.6 kW			
History	- 11	08-Apr-18 1:27:48 PM EDT	1553.1 kW	1698.8 kW	1529.5 kW	1268.2 kW			
		08-Apr-18 1:42:47 PM EDT	1277.3 kW	1907.1 kW	1869.5 kW	1846.3 kW			
		08-Apr-18 1:57:46 PM EDT	1638.2 kW	1519.4 kW	1918.5 kW	1710.6 kW			
Palette	-7	08-Apr-18 2:12:45 PM EDT	1146.8 kW	1001.1 kW	1928.4 kW	1428.3 kW			
🖿 🙁 🔊 🧯 seriesTransform	-	08-Apr-18 2:27:44 PM EDT	1511.8 kW	1244.6 kW	1981.3 kW	1530.7 kW			
TransformGraph		08-Apr-18 2:42:43 PM EDT	1329.2 kW	1505.4 kW	1358.7 kW	1718.0 kW			
HistorySource		08-Apr-18 2:57:42 PM EDT	1536.8 kW	1594.3 kW	1233.8 kW	1013.9 kW			
		08-Apr-18 3:12:41 PM EDT	1660.9 kW	1519.6 kW	1532.3 kW	1830.3 kW			





Series Transforms

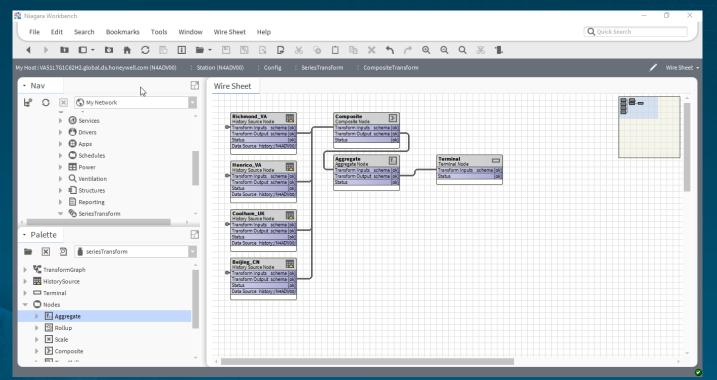
- Composite Node
- Aggregate Node
- Rollup Node
- TimeShift node





Series Transform

Aggregate Node







Series Transform

Aggregate Node

Niagara Workbench File Edit Search Bookmarks Tools Window	r Help						-	- 0	×
▲ ▶ III □ ~ III ♣ ○ III ▲ My Host: VA51LTG1C62H2:global.ds.honeywell.com (N4ADV00) : St	ation (N4ADV00) : Config		Pa 🗙 🔨 🖍 rm : transform:slot:/	Series Transform/Composite Tr	ransform			Collection	Table 👻
• Nav	timestamp	Henrico_VA_value (kW)	Beijing_CN_value (kW)	Richmond_VA_value (kW)	Coolham_UK_value (kW)	Max (kW)	Average (kW)	167 r Min (kW)	rows
My Network	08-Apr-18 10:28:00 AM EDT 08-Apr-18 10:42:59 AM EDT		1534.0 kW 1641.2 kW	1028.2 kW 1349.8 kW	1367.8 kW 1765.7 kW		1421.6 kW 1455.9 kW	1028.2 kW 1066.9 kW	î.
Q Ventilation	08-Apr-18 10:57:58 AM EDT		1894.7 kW	1263.9 kW	1695.1 kW			1117.0 kW	Ц
Reporting SeriesTransform	08-Apr-18 11:12:57 AM EDT 08-Apr-18 11:27:56 AM EDT		1431.9 kW 1742.6 kW	1588.8 kW 1943.8 kW	1299.1 kW 1397.2 kW		1516.6 kW 1612.9 kW	1299.1 kW 1367.9 kW	
Genes transform Genes transform Genes transform	08-Apr-18 11:42:55 AM EDT	1049.3 kW 1982.9 kW	1992.6 kW 1050.7 kW	1484.3 kW 1364.4 kW	1385.1 kW 1928.1 kW	1992.6 kW	1477.8 kW	1049.3 kW	
Files Hierarchy	08-Apr-18 12:12:53 PM EDT	1903.5 kW	1315.1 kW	1971.0 kW	1555.5 kW	1971.0 kW	1686.3 kW	1315.1 kW	
History	08-Apr-18 12:27:52 PM EDT 08-Apr-18 12:42:51 PM EDT	1393.8 kW 1338.8 kW	1546.2 kW 1461.8 kW	1634.3 kW 1295.7 kW	1505.9 kW 1732.7 kW		1520.1 kW 1457.2 kW	1393.8 kW 1295.7 kW	
 ✓ Palette 	08-Apr-18 12:57:50 PM EDT 08-Apr-18 1:12:49 PM EDT	1380.0 kW 1400.7 kW	1085.0 kW 1606.3 kW	1215.7 kW 1516.3 kW	1994.3 kW 1598.6 kW		1418.8 kW 1530.5 kW	1085.0 kW 1400.7 kW	
En eriesTransform		1553.1 kW	1698.8 kW	1529.5 kW	1268.2 kW		1512.4 kW	1268.2 kW	
TransformGraph		1277.3 kW 1638.2 kW	1907.1 kW 1519.4 kW	1869.5 kW 1918.5 kW	1846.3 kW 1710.6 kW		1725.0 kW 1696.7 kW	1277.3 kW 1519.4 kW	
HistorySource		1146.8 kW 1511.8 kW	1001.1 kW 1244.6 kW	1928.4 kW 1981.3 kW	1428.3 kW 1530.7 kW		1376.1 kW 1567.1 kW	1001.1 kW 1244.6 kW	
Nodes Aggregate		1329.2 kW 1536.8 kW	1505.4 kW 1594.3 kW	1358.7 kW 1233.8 kW	1718.0 kW 1013.9 kW		1477.8 kW 1344.7 kW	1329.2 kW 1013.9 kW	
Rollup		1660.9 kW	1519.6 kW	1532.3 kW	1830.3 kW		1635.8 kW	1519.6 kW	•





 \odot

Series Transforms

- Composite Node
- Aggregate Node
- Rollup Node
- TimeShift node





Series Transform Rollup Node

Niagara Workbench File Edit Search Bookmarks Tools Window Wire Sheet Help	Quick Search
↓ ► ■ □ - ■ ★ ♡ ▷ Ⅱ ■ - □ № № ₽ ₩ < ↓ /	
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : Station (N4ADV00) : Config : SeriesTransform : RollupTransformSingle	💉 Wire Sheet 👻
• Nav 🗹 Wire Sheet	
Le [®] ∑ ∑ My Network → Dower → Compatibility Compatibility → Q Ventilation → Transform Toputs schema (dd) Transform Toputs schema (dd) → Q Structures → Batua Odd Batua Odd → Q History Points → Transform Toputs schema (dd) Transform Toputs sch	
Palette Beijing_CN Beijing_CN Beijing_CN	





Series Transform Rollup Node

Niagara Workbench File Edit Search Bookmarks Tools Wind	ow Help							- 0	×
	-	B % @ Ü	B X h r						
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) :	Station (N4ADV00) : Cor	nfig : RollupTransform	nSingle : transform:sl	lot:/SeriesTransform/RollupTr	ansformSingle			Collection	n Table
• Nav								44	rows
Le O 🔀 🚯 My Network	timestamp	Henrico_VA_value (kW)	Beijing_CN_value (kW)	Richmond_VA_value (kW)	Coolham_UK_value (kW)	Max (kW)	Average (kW)	Min (kW)	Ę
	08-Apr-18 10:00:00 AM EDT	1313.4 kW	1690.0 kW	1213.9 kW	1609.6 kW	1894.7 kW	1456.7 kW	1028.2 kW	-
Power	08-Apr-18 11:00:00 AM EDT	1536.6 kW	1554.5 kW	1595.3 kW	1502.4 kW	1992.6 kW	1547.2 kW	1049.3 kW	
Ventilation	08-Apr-18 12:00:00 PM EDT	1504.0 kW	1352.0 kW	1529.2 kW	1697.1 kW	1994.3 kW	1520.6 kW	1085.0 kW	
finite Structures E Reporting	08-Apr-18 1:00:00 PM EDT	1467.3 kW	1682.9 kW	1708.5 kW	1605.9 kW	1918.5 kW	1616.1 kW	1268.2 kW	
 Reporting SeriesTransform 	08-Apr-18 2:00:00 PM EDT	1381.1 kW	1336.3 kW	1625.5 kW	1422.7 kW	1981.3 kW	1441.4 kW	1001.1 kW	
HistoryPoints	08-Apr-18 3:00:00 PM EDT	1622.1 kW	1552.0 kW	1694.6 kW	1641.7 kW	1961.4 kW	1627.6 kW	1016.9 kW	
CompositeTransform	08-Apr-18 4:00:00 PM EDT	1410.8 kW	1492.2 kW	1489.3 kW	1582.6 kW	1966.3 kW	1493.7 kW	1019.4 kW	
RollupTransformSingle	08-Apr-18 5:00:00 PM EDT	1387.9 kW	1461.6 kW	1477.2 kW	1641.4 kW	1959.3 kW	1492.0 kW	1070.0 kW	
Files	08-Apr-18 6:00:00 PM EDT	1514.3 kW	1377.1 kW	1554.9 kW	1288.3 kW	1973.4 kW	1433.7 kW	1020.7 kW	
Hierarchy	08-Apr-18 7:00:00 PM EDT	1431.6 kW	1331.5 kW	1649.3 kW	1682.7 kW	1968.8 kW	1523.8 kW	1015.0 kW	
History	08-Apr-18 8:00:00 PM EDT	1469.4 kW	1408.3 kW	1524.3 kW	1522.2 kW	1967.3 kW	1481.1 kW	1044.2 kW	
✓ Palette	08-Apr-18 9:00:00 PM EDT	1502.2 kW	1297.4 kW	1495.2 kW	1535.9 kW	1943.0 kW	1457.7 kW	1033.4 kW	
	08-Apr-18 10:00:00 PM EDT	1544.9 kW	1592.7 kW	1421.2 kW	1516.0 kW	1952.6 kW	1518.7 kW	1049.7 kW	
🖿 🐹 🖄 🎽 seriesTransform	09-Apr-18 8:00:00 AM EDT	1391.2 kW	1437.5 kW	1473.2 kW	1441.8 kW	1989.2 kW	1435.9 kW	1035.7 kW	
TransformGraph	09-Apr-18 9:00:00 AM EDT	1793.9 kW	1285.2 kW	1689.8 kW	1432.5 kW	1957.2 kW	1550.3 kW	1038.1 kW	
HistorySource	09-Apr-18 10:00:00 AM EDT	1352.9 kW	1380.0 kW	1539.7 kW	1432.4 kW	1818.0 kW	1426.2 kW	1067.7 kW	
Terminal	09-Apr-18 11:00:00 AM EDT	1712.4 kW	1635.2 kW	1726.4 kW	1548.1 kW	1923.5 kW	1655.6 kW	1301.1 kW	
Nodes	09-Apr-18 1:00:00 PM EDT	1486.9 kW	1609.2 kW	1238.9 kW	1559.4 kW	1852.6 kW	1473.6 kW	1043.5 kW	
f. Aggregate S Rollup	09-Apr-18 2:00:00 PM EDT	1516.6 kW	1378.7 kW	1647.1 kW	1467.2 kW	1986.9 kW	1502.4 kW	1051.6 kW	
Rollup	09-Apr-18 3:00:00 PM EDT	1514.2 kW	1618.4 kW	1554.1 kW	1771.9 kW	1919.8 kW	1614.7 kW	1125.0 kW	Π,





Series Transforms

- Composite Node
- Aggregate Node
- Rollup Node
- TimeShift node





Series Transform

TimeShift Node

Niagara Workbench File Edit Search Bookmarks Tools Window	v Wire Sheet Help (Q @ ・ 凹 図 译 よ る 白 階 メ う た Q Q ス 浦.	– D X
My Host: VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : S	tation (N4ADV00) : Config : SeriesTransform - : TimeShiftTransform	🖍 Wire Sheet 🔸
Image: Second secon	Richmond, VA, Yeste TimeShift ITrasform loguts, schema jok Trasform loguts, schema jok Trasform loguts, schema jok Trasform loguts, schema jok Status jok Data Source, history, Ne4D0001 Status Richmond, VA, Todie, E Composite History Source, Node Trasform loguts, schema jok Trasform loguts, schema jok Trasform loguts, schema jok Batus jok Data Source, Node Trasform loguts, schema jok Trasform Output, schema jok Trasform loguts, schema jok Trasform Output, schema jok Trasform loguts, schema jok Trasform Output, schema jok Trasform Output, schema jok Status jok Data Source, Node Satus Jok Satus Jok Satus Jok Satus	
Var TimeShiftTransform Original Files Hierarchy		
Palette Z SeriesTransform		
		•••••





Series Transform

TimeShift Node

Miagara Workbench File Edit Search Bookmarks Tools Wind	w Help			- 0	×
		× • 1 • ×	1 C		
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) :	Station (N4ADV00) : Config :	TimeShiftTransform : tra	nsform:slot:/SeriesTransform/TimeShiftTransform	Collection	n Table 👻
• Nav				62	rows
🕒 🗘 🔀 My Network	timestamp Richmo	nd_VA_Yesterday_value (kW)	Richmond_VA_Today_value (kW)		ţ\$
-	10-Apr-18 12:00:00 PM EDT 1127.9 k	W	nan kW		^
Power	10-Apr-18 12:00:00 PM EDT 1320.4 k	W	nan kW		
Ventilation	10-Apr-18 1:00:00 PM EDT 1495.4 k	W	nan kW		
Structures Reporting	10-Apr-18 1:00:00 PM EDT 1587.7 k	W	nan kW		
SeriesTransform	10-Apr-18 1:00:00 PM EDT 1653.1 k	W	nan kW		
HistoryPoints	11-Apr-18 7:00:00 AM EDT nan kW		1020.4 kW		
CompositeTransform	11-Apr-18 7:00:00 AM EDT nan kW		1220.7 kW		
RollupTransformSingle	11-Apr-18 7:00:00 AM EDT nan kW		1645.5 kW		
TimeShiftTransform	11-Apr-18 8:00:00 AM EDT nan kW		1255.6 kW		
Files	11-Apr-18 8:00:00 AM EDT nan kW		1279.7 kW		
Hierarchy	11-Apr-18 8:00:00 AM EDT nan kW		1014.5 kW		
• Palette	11-Apr-18 8:00:00 AM EDT nan kW		1810.2 kW		
	11-Apr-18 9:00:00 AM EDT nan kW		1342.4 kW		
seriesTransform	11-Apr-18 9:00:00 AM EDT nan kW		1330.6 kW		
TransformGraph	11-Apr-18 9:00:00 AM EDT nan kW		1644.8 kW		
HistorySource	11-Apr-18 9:00:00 AM EDT nan kW		1983.9 kW		
Terminal	11-Apr-18 10:00:00 AM EDT nan kW		1054.3 kW		
O Nodes	11-Apr-18 10:00:00 AM EDT nan kW		1039.8 kW		
	11-Apr-18 10:00:00 AM EDT nan kW		1692.6 kW		
	11-Apr-18 10:00:00 AM EDT nan kW		1304.2 kW		





Problem?

- Need to display results from Series Transforms
- Need to export results from Series Transforms
- Need to conveniently organize data as an array





Solution!

• Reports and Charts







- Report Px View
- Component Grid
- Output Report to file







- Report Px View
- Component Grid
- Output Report to file





Report Px View

👫 New Px Vie	w	×
Px New Po Create an	c View new view on the component using a px file	
View Name View Icon	Report module://icons/x16/views/view.png	
Target Media	Workbench PxMedia	
Source	HxPx Media Mobile PxMedia Report Px Media	
	Workbench PxMedia OK Cancel	



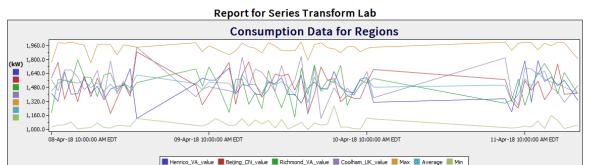


Reports Report Px View

Page #

TRIDIUM 23

TRIDIUÂ

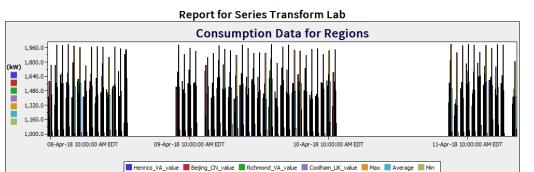


								52 rows
timestamp	Henrico_VA_value (kW)	Beijing_CN_value (kW)	Richmond_VA_value (kW)	Coolham_UK_value (kW)	Max (kW)	Average (kW)	Min (kW)	17
08-Apr-18 10:00:00 AM EDT	1411.7 kW	1587.6 kW	1189.0 kW	1566.8 kW	1765.7 kW	1438.8 kW	1028.2 kW	
08-Apr-18 11:00:00 AM EDT	1320.2 kW	1765.5 kW	1570.2 kW	1444.1 kW	1992.6 kW	1525.0 kW	1049.3 kW	
08-Apr-18 12:00:00 PM EDT	1654.7 kW	1343.4 kW	1566.3 kW	1680.6 kW	1982.9 kW	1561.3 kW	1050.7 kW	
08-Apr-18 1:00:00 PM EDT	1402.8 kW	1574.3 kW	1532.7 kW	1676.8 kW	1994.3 kW	1546.7 kW	1085.0 kW	
08-Apr-18 2:00:00 PM EDT	1406.5 kW	1317.6 kW	1796.7 kW	1596.9 kW	1981.3 kW	1529.4 kW	1001.1 kW	
08-Apr-18 3:00:00 PM EDT	1584.9 kW	1609.4 kW	1595.7 kW	1455.6 kW	1961.4 kW	1561.4 kW	1013.9 kW	
08-Apr-18 4:00:00 PM EDT	1413.4 kW	1371.2 kW	1591.5 kW	1530.6 kW	1758.3 kW	1476.7 kW	1019.4 kW	



Report Px View

TRIDIUM



								52 rows
timestamp	Henrico_VA_value (kW)	Beijing_CN_value (kW)	Richmond_VA_value (kW)	Coolham_UK_value (kW)	Max (kW)	Average (kW)	Min (kW)	₽
08-Apr-18 10:00:00 AM EDT	1411.7 kW	1587.6 kW	1189.0 kW	1566.8 kW	1765.7 kW	1438.8 kW	1028.2 kW	
08-Apr-18 11:00:00 AM EDT	1320.2 kW	1765.5 kW	1570.2 kW	1444.1 kW	1992.6 kW	1525.0 kW	1049.3 kW	
08-Apr-18 12:00:00 PM EDT	1654.7 kW	1343.4 kW	1566.3 kW	1680.6 kW	1982.9 kW	1561.3 kW	1050.7 kW	
08-Apr-18 1:00:00 PM EDT	1402.8 kW	1574.3 kW	1532.7 kW	1676.8 kW	1994.3 kW	1546.7 kW	1085.0 kW	
08-Apr-18 2:00:00 PM EDT	1406.5 kW	1317.6 kW	1796.7 kW	1596.9 kW	1981.3 kW	1529.4 kW	1001.1 kW	
08-Apr-18 3:00:00 PM EDT	1584.9 kW	1609.4 kW	1595.7 kW	1455.6 kW	1961.4 kW	1561.4 kW	1013.9 kW	
08-Apr-184:00:00 PM EDT	1413.4 kW	1371.2 kW	1591.5 kW	1530.6 kW	1758.3 kW	1476.7 kW	1019.4 kW	





Page #



- Report Px View
- Component Grid
- Output Report to file





Component Grid

🚰 Niagara Workbench				– 0 ×
File Edit Search Bookmarks Tools	Window Grid Editor Help			Q Quick Search
		③ □ ℡× 1 ペ ■	₽ ×	
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV0	00) : Station (N4ADV00) : Config : I	Reporting : Building1		🖍 Grid Editor
• Nav	Name slot:	Value slot:	Status slot:	Path slot:
🚽 🔿 🗵 🔇 My Network	%displayName%	%out.value%	%out.status%	96slotPath96
▶ Q Ventilation	station: slot:/Reporting/Data			
Structures		🛕 Empty Q	Juery	
Reporting Data	station: slot:/Reporting/Data/Zone1FanCmd			~
B Zone1FanCmd	station: slot:/Reporting/Data/Zone2FanCmd			
▶ B Zone2FanCmd	station: slot:/Reporting/Data/Zone3FanCmd			
B Zone3FanCmd	station: slot:/Reporting/Data/Zone4FanCmd			
B Zone4FanCmd	station: slot:/Reporting/Data/Zone5FanCmd			
Zone5FanCmd	station: slot:/Reporting/Data/Zone1Temp			
FanSchedules	station: slot:/Reporting/Data/Zone2Temp			
N Zone1Temp N Zone2Temp	station: slot:/Reporting/Data/Zone3Temp			
Cone3Temp	station: slot:/Reporting/Data/Zone4Temp			
▶ 🔃 Zone4Temp	station: slot:/Reporting/Data/Zone5Temp			
Ø Zone5Temp				
Building1				





Component Grid

🎦 Niagara Workbench				
File Edit Search Bookmarks Tools	Window H	lelp		
	i 📁 -		R R X @	i 🗈 🗙
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV0	0) : Station	(N4ADV00) :	Config : Reporting	: Building1
- Nav	Name	Value Status	Path	
🚽 🔿 🙁 🕟 My Network 🗸	Zone1FanCmd	Off {ok}@	16 slot:/Reporting/Data/Z	one1FanCmd
	Zone2FanCmd	Off {ok}@	16 slot:/Reporting/Data/Z	one2FanCmd
Q Ventilation	Zone3FanCmd	Off {ok}@	16 slot:/Reporting/Data/Z	one3FanCmd
Structures Reporting	Zone4FanCmd	Off {ok}@	16 slot:/Reporting/Data/Z	one4FanCmd
O Data	Zone5FanCmd	Off {ok}@	16 slot:/Reporting/Data/Z	one5FanCmd
B Zone1FanCmd	Zone1Temp	68.4 {ok}@	16 slot:/Reporting/Data/Z	one1Temp
▶ ^B Zone2FanCmd	Zone2Temp	68.4 {ok}@	16 slot:/Reporting/Data/Z	one2Temp
B Zone3FanCmd	Zone3Temp	68.4 {ok}@	16 slot:/Reporting/Data/Z	one3Temp
B Zone4FanCmd	Zone4Temp	68.4 {ok}@	16 slot:/Reporting/Data/Z	one4Temp
B Zone5FanCmd	Zone5Temp	68.4 {ok}@	16 slot:/Reporting/Data/Z	one5Temp
FanSchedules				
Zone1Temp				
N Zone2Temp				
V Zone3Temp				
V Zone4Temp				
V Zone5Temp				
Building1				





Component Grid in Px View

			\triangleright	Page #
Building 1	Repo	ort		
Name	Value	Status	Path	Ę
Zone1FanCmd	Off	{ok}@16	slot:/Reporting/Data/Zone1FanCmd	
Zone2FanCmd	Off	{ok}@16	slot:/Reporting/Data/Zone2FanCmd	
Zone3FanCmd	Off	{ok}@16	slot:/Reporting/Data/Zone3FanCmd	
Zone4FanCmd	Off	{ok}@16	slot:/Reporting/Data/Zone4FanCmd	
Zone5FanCmd	Off	{ok}@16	slot:/Reporting/Data/Zone5FanCmd	
Zone1Temp	76.0	{ok}@16	slot:/Reporting/Data/Zone1Temp	
Zone2Temp	76.0	{ok}@16	slot:/Reporting/Data/Zone2Temp	
Zone3Temp	76.0	{ok}@16	slot:/Reporting/Data/Zone3Temp	
Zone4Temp	76.0	{ok}@16	slot:/Reporting/Data/Zone4Temp	
Zone5Temp	76.0	{ok}@16	slot:/Reporting/Data/Zone5Temp	

11-Apr-18 7:04 PM EDT







- Report Px View
- Component Grid
- Output Report to file





Reports Output Report to File

4	Niag	ara V	/orkbei	nch																				
	File	2	Edit	S	Search	Boo	kmark	s T	ools	Wind	dow	W	/ire Sl	neet	t	Help								
	•	►			- 🗆	0	ħ	\mathcal{O}	P.	i		*		Ľ	8	ß	₽	Ж	G	Ĩ	Ē	×	1	_ (*
My	Host	VA5	1LTG1C	62H	12.global.	ds.hon	eywell.	com (N	I4ADV00		Stati	ion (N4AD	/00)		: Co	nfig		Services	s :	Repor	tService		
ŀ	- Na	av										ĥ	wi ک	re S	Shee	et								
	•	C	×		🕤 My Ne	etwork																		
				•	Aud	- litHisto	ryServi	œ			-				Expor Export	tSource	ce	G]		FileRec File Reci	ipient		
				Þ	O Log	History	Service								Genera Dut	te					Route			
				Þ	Prog	gramSe	rvice							C										
				Þ	🕗 Sear	rchServ	ice						_											
				Þ	🛇 Tagl	Diction	aryServ	ice					_											
				₽	🗐 Tem	plateS	ervice																	
				₽	🛞 Web	Service	2																	
				Þ	🕟 Rep	ortServ	vice						_											
				₽	📅 Plat	formSe	ervices						-											





Reports Output Report to File

🧏 Building1	Report.pdf -	Adobe Acrobat Read	der DC											_	đ
File Edit	View Wind	ow Help													
Home	Tools	Documer	B	എ	\bowtie	Q	1	/ 1	Q					?	Sign

Building 1 Report

Name	Value	Status	Path
Zone1FanCmd	Off	{ok} @ 16	slot:/Reporting/Data/Zone1FanCmd
Zone2FanCmd	Off	{ok} @ 16	slot:/Reporting/Data/Zone2FanCmd
Zone3FanCmd	Off	{ok} @ 16	slot:/Reporting/Data/Zone3FanCmd
Zone4FanCmd	Off	{ok} @ 16	slot:/Reporting/Data/Zone4FanCmd
Zone5FanCmd	Off	{ok} @ 16	slot:/Reporting/Data/Zone5FanCmd
Zone1Temp	75.6	{ok} @ 16	slot:/Reporting/Data/Zone1Temp
Zone2Temp	75.6	{ok} @ 16	slot:/Reporting/Data/Zone2Temp
Zone3Temp	75.6	{ok} @ 16	slot:/Reporting/Data/Zone3Temp
Zone4Temp	75.6	{ok} @ 16	slot:/Reporting/Data/Zone4Temp
Zone5Temp	75.6	{ok} @ 16	slot:/Reporting/Data/Zone5Temp





1

Problem?

- Need to combine data and perform extensive analytics on results
- Need tool that is robust and can do more than basics of Series Transforms





Solution!

Niagara 4 Analytics





Niagara 4 Analytics

- Algorithms
- Alerts
- Analytic Graphics





Niagara 4 Analytics

- Algorithms
- Alerts
- Analytic Graphics





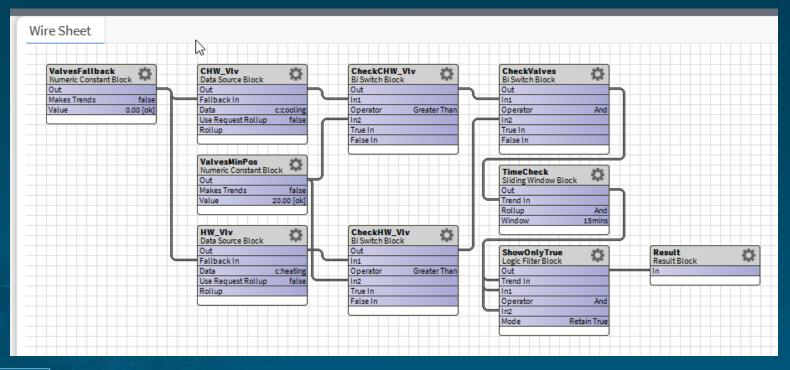
Niagara 4 Analytics Algorithms

4	Niag	ara Wo	orkben	ch							
	File	e E	dit	Search	Boo	kmark	is 1	Fools	Win	dow	
	•	►		•	0	ħ	C	ē.	i		Ŧ
My			ation (Supervisor	Station				Servio		
ľ	• Na	av									
L	L.	C	\times	🕄 My N	etwork					-	
		-	e c	-						1	h.
l				Services							
L				Ala						1	i
L				- 🖽 Ana						- 1	
L				-	·	nyAlerts				. 1	
ŀ					~			nLightir	ng		
Г						A Che			-		
L		_				A Im	HighA	lert			
L	1			- G	Algori	thms					
L	L			-	G	nyAlgor	ithms			- 1	
L	L							chedOf	f	- 1	
L	L					СНУ		Valves		- 1	
L	L					kw_				- 1	
L	L					FCU				_	
L	1					🖗 Chil	lerAm	oLimit			
L					Defini						
					Poller	reBuilt	Definit	ions			
				-	Poller						
					~	lanualT	rinner				,
Ľ										•	





Niagara 4 Analytics Algorithms





TRIDIUM 37

Niagara 4 Analytics

- Algorithms
- Alerts
- Analytic Graphics





Niagara 4 Analytics

4	Niagar	ra Workbench							— ć	ı X
	File	Edit Search Bookmar	ks Tools Window Alarm	Help					Q Quick Search	
	4		S 🕞 🗉 🖬 - 💾 🛙	1 F P	X @ 🛙	B × h c V				
My	Host:\	VA51LTG1C62H2.global.ds.honeywel	ll.com (N4ADV00) : Station (Supervise	rStation) :	Config : Services	: AlarmService : AnalyticConsole			🖍 AX Alar	n Console 🔻
	• Na		_							
			AX Alarm Console							
		O 🗵 🔇 My Network 🗸	Time Range ? to ? 🕑						1 Sources / 4	
		Alarm	Open Alarm Sources	Source State	Ack State	Source	Alarm Class	Priority	Message Text	Riannis
		🔻 🖨 Config	11-Apr-18 7:43:42 PM EDT			station\$3a\$7ch\$3a1b3a2_OverriddenLighting			%er:alarm:AlarmRecord:er:AlertEntry:nod	_
		 Gervices 	TI-ADI-10 7:45:42 PM EDI	rduit	VAcked / 4 Offacked	stationssasrchssarbsaz_overhodentighting	AnalyticAlamiciass	255	semalarmatarmatericenty indu	270
		AlarmServic								
		 Image: Consol Image: Consol 								
		Analyti								
		Analyti								
1		AnalyticSer								
		🔻 🗔 Alerts								
		👻 📿 m								
		►⊿								
		▶ ⊿								
		► Z ► C Algorit								
		 Argone To m; 								
		⊳ d								
		⊳ d								
		⊳d								
		⊳d								
		× 11 ×	A A	knowledge	°, Hyperlink	Notes Silence	Filte	er 👘	Review Video	





Niagara 4 Analytics

- Algorithms
- Alerts
- Analytic Graphics





Niagara 4 Analytics **Tables**

Understanding Aggregation

6

Understanding Rollup



Understanding Algorithms CHW and HW Valves Open

æ

Timestamp Value Status

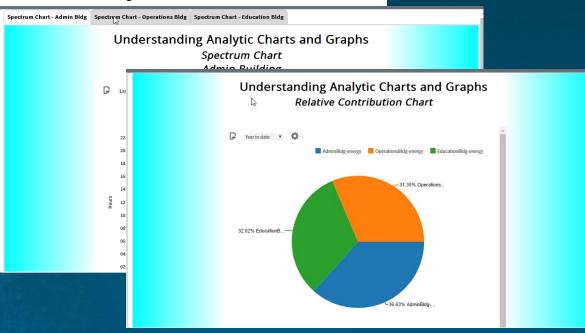
LW Hi	gh Limit		
Timestamp	Value	Status	Ę₽
01-Apr-18 10:45:00 AM EDT	HighDemand	{ok}	4
02-Apr-18 8:30:00 AM EDT	HighDemand	{ok}	
02-Apr-18 8:45:00 AM EDT	HighDemand	{ok}	
02-Apr-18 9:00:00 AM EDT	HighDemand	{ok}	
02-Apr-18 9:15:00 AM EDT	HighDemand	{ok}	
02-Apr-18 9:30:00 AM EDT	HighDemand	{ok}	
02-Apr-18 9:45:00 AM EDT	HighDemand	{ok}	
02-Apr-18 10:00:00 AM EDT	HighDemand	{ok}	
02-Apr-18 10:15:00 AM EDT	HighDemand	{ok}	
02-Apr-18 10:30:00 AM EDT	HighDemand	{ok}	
02-Apr-18 10:45:00 AM EDT	HighDemand	{ok}	
02-Apr-18 11:00:00 AM EDT	HighDemand	{ok}	
02-Apr-18 11:15:00 AM EDT	HighDemand	{ok}	
			Ŧ



Niagara 4 Analytics Charts

Understanding Analytic Charts and Graphs Ranking Chart

> Understanding Analytic Charts and Graphs Average Profile Chart







Problem?

- Need convenient way to navigate through station
- As project grows need custom navigation to dynamically update without additional work by programmer





Solution!

• Hierarchies





- GroupLevelDef
- ListLevelDef/NamedGroupDef
- QueryLevelDef
- RelationLevelDef





- GroupLevelDef
- ListLevelDef/NamedGroupDef
- QueryLevelDef
- RelationLevelDef





GroupLevelDef

🙀 Niagara Workbench	– 0 ×
File Edit Search Bookmarks Tools Window Help	Q abc:school
My Host: VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : Station (N4ADV00) : Config : Services : HierarchyService : GlobalData	🖍 🖌 AX Property Sheet 👻
Nav Property Sheet	
🚽 🔾 🔀 My Network	
The output of th	
JobService	
RoleService BuserService BuserService	
AuthenticationService	
AddientationService A	
Cache Status Not Cached	
V FoxService I Cache Creation Time null	
GHierarchyService Gate On Station Started Gate	
👻 🖽 GlobalData 💎 🛏 Schedules Group Level Def group By: abc:my Schedu	
🕨 🗋 Scope 🕥 🐨 😧	
Group By abc:mySchedules	
▶ 🛏 Calendars 🕞 Sort Ascending 🗸	
Eschools Hierarchy Tags	
HistoryService Query Level Def: n:type like 'schedule:Ca	
AuditHistoryService	
O LogHistoryService	
ProgramService	
SearchService	
C TagDictionaryService TomplateService	
Difemplateservce	
C Refresh	
	9





GroupLevelDef

Series Fransform	
Files	
🔻 🔚 Hierarchy	
📼 🖼 GlobalData	
🔻 🔘 Schedules	
BasketballGames	
FederalHolidays	
PTAMeetings	
SchoolHolidays	
Schools	
History	
	Υ.





- GroupLevelDef
- ListLevelDef/NamedGroupDef
- QueryLevelDef
- RelationLevelDef





ListLevelDef/NamedGroupDef

Niagara Workbench – 🗇 🗙								
File Edit Search Bookmarks Tools Window	Help	Q abc:school						
rHost: VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : Station (N4ADV00) : Config : Services + : HierarchyService : Schools 🗸 AX Property Sheet +								
- Nav	Property Sheet							
ピ 🔿 🗵 🖏 My Network	Status {ok}	A						
-	Fault Cause							
RoleService	File Scope Hierarchy Scope Container							
UserService	Frags Hierarchy Tags							
AuthenticationService	Cache Status Not Cached							
DebugService	Cache Creation Time null							
BoxService	📔 Cache On Station Started 🛛 🛑 false 📃							
FoxService	🛥 Schools List Level Def							
B HierarchyService	Query Context 🔉 🕲 🗸							
▶ 🖻 GlobalData	Sort None							
Schools								
Scope	▶ Tags Hierarchy Tags ▼ MighSchools Named Group Def: abcschool like '.*High'							
Schools	Query abc:school like '.*High'							
GetSchools	A Tags Hierarchy Tags							
ProxyPoints	MiddleSchools Named Group Def: abc:school like '.*Midc							
HistoryService	Query abc:school like '.*Middle'							
AuditHistoryService	Fags Hierarchy Tags							
LogHistoryService	ElementarySchools Named Group Def: abc:school like '.*Elen							
ProgramService	Query abc:school like '.*Elementary'							
SearchService TagDictionaryService	► 🖉 Tags Hierarchy Tags							
agDictionaryService TagDictionaryService	CatSchoola Quary Lavel Dafe artypa = laiogoraDateri)							
WebService	ProxyPoints Relation Level Def: out: n:childPoint							
	💭 Refresh 🔳 Save							





ListLevelDef/NamedGroupDef

Hierarchy

×

🕒 GlobalData Schools Ŧ HighSchools -JACE02 JACE03 JACE04 MiddleSchools Ŧ JACE05 JACE06 ElementarySchools w. JACE07





- GroupLevelDef
- ListLevelDef/NamedGroupDef
- QueryLevelDef
- RelationLevelDef





QueryLevelDef

Niagara Workbench	– ¤ × _
File Edit Search Bookmarks Tools Window Help	Q abc:school
ty Host:VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : Station (N4ADV00) : Config : Services : HierarchyService : Schools	🖍 🛛 AX Property Sheet 👻
Nav Property Sheet	
E Schools (Hierarchy)	
My Modules	
ger My Tools Eault Cause	
Tradit Cause Fault Cause	
Alarm Hierarchy Tags	
Cache Status Not Cached	
Cache Creation Time null	
Cache On Station State Cache On Station State	
E GlobalData	
✓	
✓ D HighSchools Query Context >> (9) ·	
JACE02 Query n:type = 'niagaraDriver:NiagaraStation'	
▶ 🚡 JACE03 🕥 Include Grouping Queries ● true 👻	
JACE04 Sort Ascending -	
MiddleSchools ProxyPoints Relation Level Def: out: n:childPoint	
 ▶ ≦ JACE05 ▶ ≦ JACE06 	
LerentarySchools	
Liementaryschools Acco7	
M History	
C Refresh	





- GroupLevelDef
- ListLevelDef/NamedGroupDef
- QueryLevelDef
- RelationLevelDef





RelationLevelDef

👫 Niagara Workbench			– 0 ×
File Edit Search Bookmarks Tools Window	Help		Q abc:school
	• • • • • •		
			A
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : Stryio	n (N4ADV00) : Config : Services	: HierarchyService : Schools	AX Property Sheet 🗸
✓ Nav	Property Sheet		
ピ 🖸 🔀 🕅 My Network	🖽 Schools (Hierarchy)		
-	Query Context	» • ·	
BackupService	Status	{ok}	
CategoryService	Fault Cause		
RoleService	🕨 🎦 Scope	Hierarchy Scope Container	
UserService	Tags	Hierarchy Tags	
AuthenticationService	Cache Status	Not Cached	
DebugService	Cache Creation Time	null	
BoxService	Cache On Station Started	🛑 false 🔻	
FoxService	Schools	List Level Def	
The HierarchyService	GetSchools	Ouery Level Def: n:type = 'niagaraDriver:t	
▶ 🖿 GlobalData	Here ProxyPoints	Relation Level Def: out: n:childPoint	
👻 🖽 Schools	Query Context	» • ·	
Scope	Inbound Relation Ids		
Schools	Outbound Relation Ids	n:childPoint	
GetSchools	Filter Expression		
ProxyPoints	Repeat Relation	false -	
definition HistoryService	Caching Repeat Limit	5 [1 - max]	
AuditHistoryService	Sort 🗋	Ascending 🗸	
LogHistoryService			
ProgramService			
Concelifonnian		C Refresh Save	
	2		





Problem?

- Need to reduce time to upgrade small job to large job
- Do not want to spend time 're-doing' work that was done previously





Solution!

• Exports Tags





Export Tags

- Prepare Supervisor Station
- Prepare JACE Station
- Merge Stations





Export Tags

- Prepare Supervisor Station
- Prepare JACE Station
- Merge Stations





Export Tags Prepare Supervisor Station

Niagara Workbench – 🗇 🗙							
File Edit Search Bookmarks Tools Wind	ow Help	Q abc:school					
Host: VA51LTG: C62H2: global.ds.honeywell.com (N4ADV00) : Station (N4ADV00) : Config : Drivers : NiagaraNetwork : SupervisorExportTagNetworkExt 🖌 AX Property Sheet 🗸							
		set topetty sheet					
▼ Nav	Property Sheet						
🖆 🗘 🐹 🔇 My Network	SupervisorExportTagNetworkExt (Supervisor Export Tag Network Ext) Status						
Config	Category Filters Category Filter Ext						
Services	Alarm Source Info Alarm Source Info						
Drivers	Cast Join and Andrew Cast Andr						
 NiagaraNetwork ACE01 	Station Folder Path slot: \$ (State) \$ [City]						
JACE01							
► ■ JACE03	Log Limit 600 [-1-10000]						
▶ 🖀 JACE04							
JACE05							
▶ 🖀 JACE06							
JACE07 G SupervisorExportTagNetworkExt							
G Supervisorexport ragivet workext	*						
✓ Palette							
🖿 🗶 🖻 🛓 exportTags							
SupervisorExportTagNetworkExt							
O SubordinateExportTagNetworkExt							
Extensions							
Examples	🗸 🖸 Save						
Examples	C Refresh						





Export Tags

- Prepare Supervisor Station
- Prepare JACE Station
- Merge Stations





Export Tags Prepare JACE Station

🚰 Niagara Workbench			– 0 ×
File Edit Search Bookmarks Tools Window H	lelp		Q abc:school
		× 5 C	
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : Station:	4912 (JACE10) : Config : Drivers : Nia	garaNetwork : SupervisorStation : Join Profile	🖍 AX Property Sheet 👻
• Nav	Property Sheet		1
🚽 🗘 🕱 My Network	🔊 Join Profile (Join Profile)		
	🚡 Status	{ok}	
Alarm Source Info O Client Connection	Enabled Enabled	true v	
Points	Last Solin		
Histories	🗎 Station Display Name	HenricoHigh 🕜	
Alarms	Default Subordinate User	admin 👻	
Schedules	Default Subordinate User Password	••••••	
Users	Default Subordinate IP Address	192.168.1.40 ⑦	
Sys Def	Default Subordinate Port	<pre>\$foxService.foxPort.publicServerPort\$</pre>	
Virtual Files	Default Subordinate Use Fox TLS	false 🗸	
Join Profile	Default Subordinate Fox TLS Port	\$foxService.foxsPort.publicServerPort\$ (?)	
M Station Info	-	· · · · · · · · · · · · · · · · · · ·	
Apps	Carlon File	file:^joinProfiles\$(defaultStationFileName).bog	
Files	Station Info	Station Information	
Hierarchy	City Richmond		
History	State Virginia		
• Palette			
🖿 🗙 🖄 🗋 exportTags 🗸			
O SupervisorExportTagNetworkExt			
► Ω SubordinateExportTagNetworkExt		C Refresh Save	
			0





Export Tags

- Prepare Supervisor Station
- Prepare JACE Station
- Merge Stations





Export Tags Merge Stations

🚰 Niagara Workbench	– 0 ×
File Edit _z lin ₂ Search Bookmarks Tools Window Manager Help	Q abc:school
	>> > > <
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : Station (N4ADV00) : Config : Drivers : NiagaraNetwork : JACE10 : Points : Virginia	Niagara Point Manager 👻
- Nav Database	1 objects
😫 🔿 🔀 🚳 My Network 🔹 Name Point Id Out Subscription Status	₿
ACEOS	
Accos	
▶ 🖀 JACE07	
alace10	
Alarm Source Info	
Client Connection	
Points	
Ell Virginia Ell Richmond	
O SpaceTemp	
SupplyTemp	
Return Temp	
CHW_Valve	
Dampers	
HW_Valve	
 Histories Alarms 	
Anims Gradues	
O Users	
Palette Palette Image: New Folder New ✓ Edit Madd Maddd Madd	Match 🖏 Tagit



Problem?

- Need to efficiently backup stations on a large site
- Need to efficiently update modules on a large site
- Need to efficiently manage a large site





Solution!

Provisioning Niagara





Provisioning Niagara

- Backup Stations
- Updates Stations





Provisioning Niagara

- Backup Stations
- Update Stations





Provisioning Niagara Backup Stations

Magara Workbench		- 0 ×
File Edit Search Bookmarks Tools Window Help		Q abc:school
	: Drivers : NiagaraNetwork : TriggerSchedule	🖌 🛛 AX Trigger Scheduler 👻
		AX migger scheduner +
✓ Nav	Prev Page Prev Month Today Next Month Next Page	01h:00m
Le O 🐹 🛇 My Network 🔹 Apr 2018		
s m t w t Station (N4ADV00) 1 2 3 4 5		
▶ ∰ Station (N4ADV00) 1 2 3 4 5 ▼ ∰ Station:4912 (JACE10) 8 9 10 11 11		
Alarm 15 16 17 18 19		
Config 22 23 24 25 26		
Services 29 30	27 28 29 30 31 24 25 26 27 28 29 30 29 30 31	
O Drivers		
NiagaraNetwork		
SubordinateExportTagNetworkExt Name Summ ProvisioningNwExt		
MonthlyBackup Week Ar	d Day: Mon Week 1 Every Month	
TriggerSchedule		
JACE01		
Apps		
Files		
Hierarchy		12:00 AM
General History		✓ Range Range End 11:59 PM ♣
		Range Interval +00001h 00m
- Delette		Add Remove
) Add 🕒 Edit 🔺 Priority 🔻 Priority 🏋 Rename 💥 Delete	
🖿 🔀 🧕 provisioningNiagara	Save C Refresh	





Provisioning Niagara Update Stations

Niagara Workber 🏷 — 🗇 🗙					
File Edit Search Bookmarks Tools Window H	lelp		Q abc:school		
		⊙ □ ℡ × ↑ ૮			
My Host : VA51LTG1C62H2.global.ds.honeywell.com (N4ADV00) : Station:	:4912 (JACE10) : Config : D	Drivers : NiagaraNetwork : NiagaraNetworkJobPrototype	Niagara Network Prototype View 👻		
Nav Nav Nav Station (N4ADV00) Station:4912 (JACE10)	Generate an alarm when any ste Generate an alarm when job con initial steas to run only once New Job Step Select the type of step to add to the job below:	npletes successfully			
Alarm	Туре	Description 🕫			
G Services Orivers	Backup Stations	Back up each station in the job			
Onvers Onvers Onvers Onvers	Copy Supervisor File	Copy a file from the supervisor's filesystem to each station in the job			
 O SubordinateExportTagNetworkExt 	Install Certificate	Install a certificate to the user trust store of each station Install software to the stations in the job			
SupervisorStation	Reboot	Reboot each station in the job			
ProvisioningNwExt	Run Robot	Run a robot on each station			
diagaraNetworkJobPrototype TriggerSchedule	-	Upgrade out-of-date software for each station in the job			
 Definition Files Hierarchy History 		OK Cancel			
4					
• Palette					
🖿 🗶 🙍 provisioningNiagara		F Run Now Save	Refresh		
Add: Add a step to the job					





Examples







Don't be part of the 'Bucket Brigade'









Take advantage of the new features in Niagara 4







How?

Niagara 4 Advanced Technical Certification Program (TCP) (AMER)

STATUS: Enrolled | KEYWORDS: ilt english amer | LANGUAGE: English | TYPE: Event



Educates students to an Advanced level of technical expertise to effectively and efficiently design, engineer, and program "cyber-secure", enterprise-wide, supervisor projects using the Niagara 4 Framework and demonstrate how to migrate existing Niagara AX stations to the N4 model. | Prerequisites: Niagara 4 certification | Audience: Systems Integrators, OEMs, distributors, and other business partners | Certification: Niagara 4 Advanced TCP | 5-day, Instructor Led Training, Part #: TRN-CRS-N4-ADV, Price: \$2890 USD

Material	Description	Instructions	Downloads
Agenda N4 Advanced TCP (5.15.17)	Brief class agenda.	Download PDF and review.	[Niagara 4 Advanced Training Agenda (5.15.17).pdf]
Training Locations (10.24.16)	List of recommended accommodations and travel instructions.	Don't book travel until you have received enrollment confirmation.	[Training Locations AMER 10-24- 16.pdf]













Niagara 4 Advanced TCP (Tridium)

- May 7 11, 2018 Stanford University – Palo Alto, CA •
 - May 14 18, 2018
- Jul 30 Aug 3, 2018 •

•

- May 28 Jun 1, 2018 ٠
- Jun 11 15, 2018 •
- Jun 18 22, 2018 •
- Jun 25 29, 2018 •

- Tridium HQ Richmond, VA
- Tridium EMEA HQ Coolham, UK
- Padova, Italy
 - Monza, Italy
 - Kuala Lumpur, Malaysia
 - Adelaide, Australia



- Jun 4 8, 2018 Madison Heights, MI
- Jun 18 22, 2018 Cleveland OH



Honeywell

- Apr 23 27, 2018
- May 7 11, 2018
- Jun 4 8, 2018
- Oct 22 26, 2018
- Nov 5 9, 2018

Minvalco Control Depot G&O Thermal Jackson Controls USG Minneapolis, MN Omaha, NE Chicago, IL Indianapolis, IN Cedar Knolls, NJ



Vardell Technical Training

- Apr 23 27, 2018 Green Bay, WI
- Jun 4 8, 2018 Philadelphia, PA
- Jul 30 Aug 3, 2018 Lake Forest, CA

TRIDIUM

MOV Training

- Jul 30 Aug 4, 2018
- Aug 27 31, 2018
- Sep 17 21, 2018
- Dec 10 14, 2018
- Jan 14 18, 2019

Minneapolis, MN Wisconsin (exact location pending) Chicago, IL Houston, TX Dallas, TX





Thanks Again



