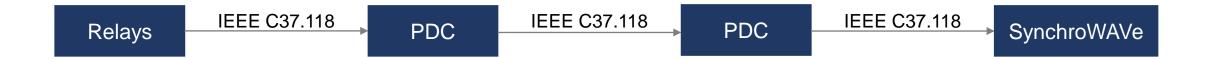
SEL SynchroWAVe Archive Presentation

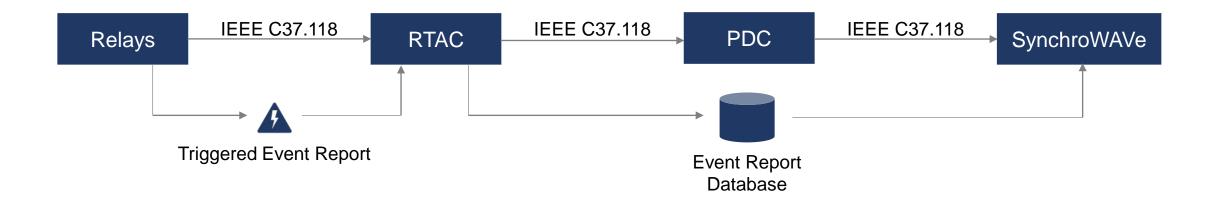
NASPI Data and Archive Workshop 4/15/2019

Jared Bestebreur, Lead Product Manager Schweitzer Engineering Laboratories

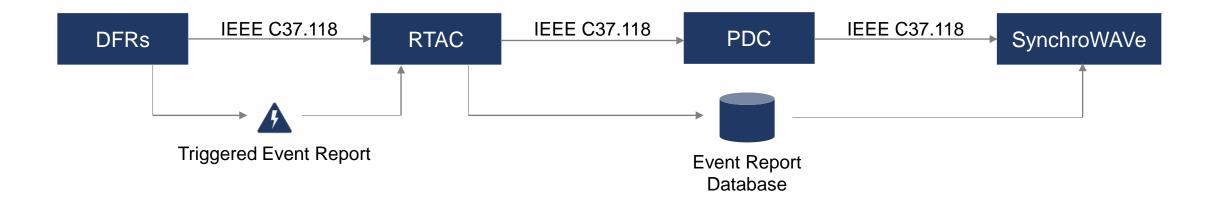
Traditional Synchrophasor Architecture

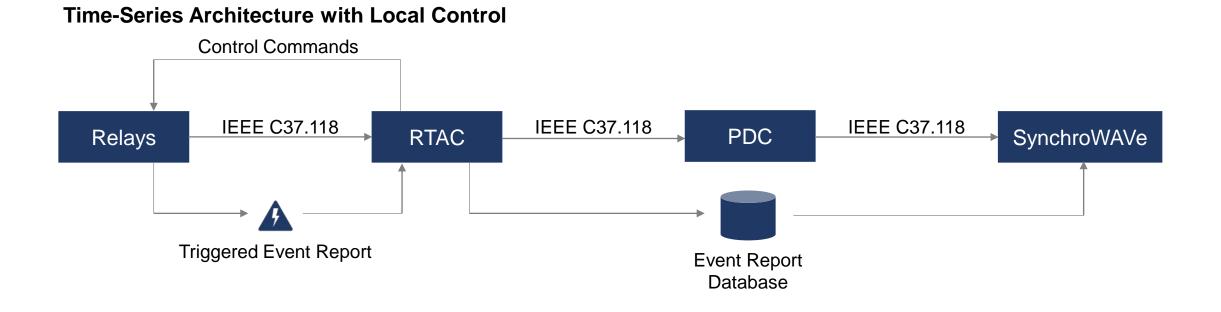


Time-Series Architecture

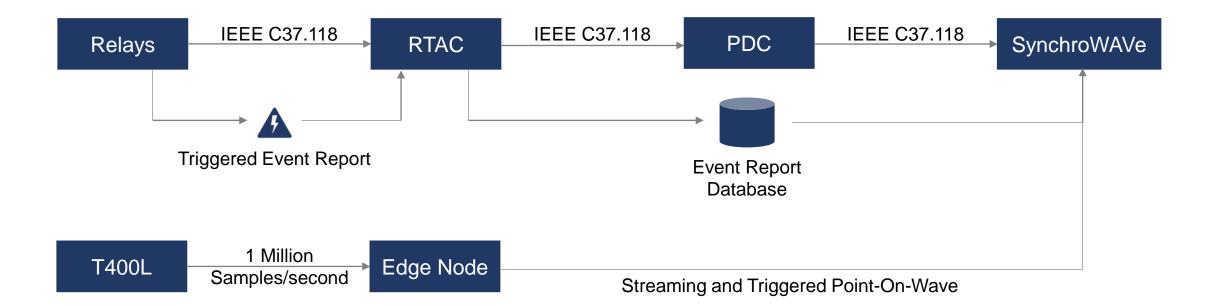


Time-Series Architecture

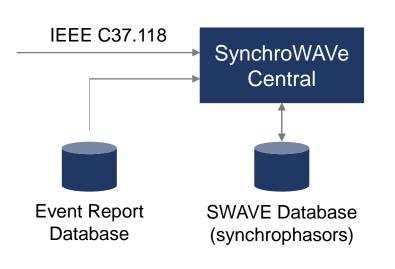


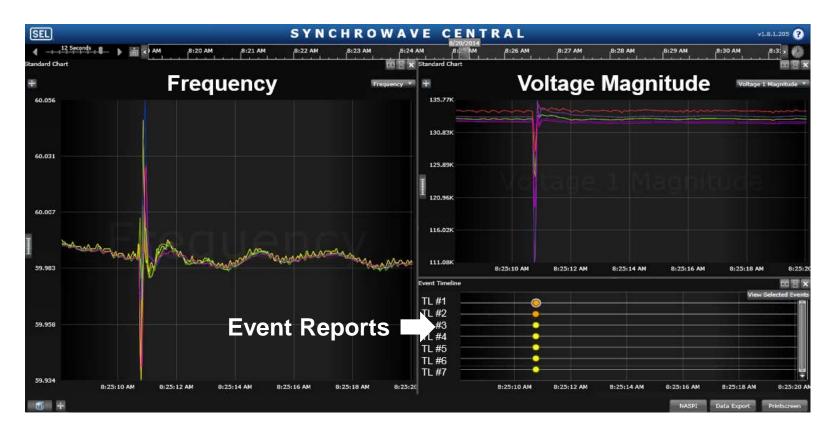


Time-Series Architecture

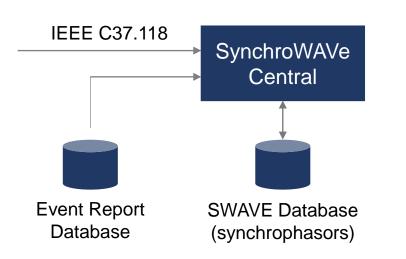


SynchroWAVe Central Architecture





SynchroWAVe SWAVE Database



SWAVE Database Features:

- Time-series database.
- File/Folder architecture (Local, SAN, NAS)
- Simple management.
- 1 file per day, per PMU.
- Raw file viewer.
- Max/Min Index for fast 1 second to 1 year zoom.

SynchroWAVe SWAVE Database Example

🗸 🗸 🖡 k Computer k				- 4 y	Search Historian		
)rganize 🔻 New folder						· = •	(
🔶 Favorites	Name	Date modified	Туре	Size			
📃 Desktop	鷆 Atlanta_GA	2/11/2019 4:00 PM	File folder				
〕 Downloads	Barrie_ON	2/11/2019 4:00 PM	File folder				
🕮 Recent Places	Boerne_TX	2/11/2019 4:00 PM	File folder				
	Boise_ID	2/11/2019 4:00 PM	File folder				
	Dothell_WA	2/11/2019 4:00 PM	File folder				
	Dutte_MT	2/11/2019 4:00 PM	File folder				
	Charlotte_NC	2/11/2019 4:00 PM	File folder				
	퉬 Chicago_IL	2/11/2019 4:00 PM	File folder				
	Columbus_OH	2/11/2019 4:00 PM	File folder				
	퉬 Detroit_MI	2/11/2019 4:00 PM	File folder				
📮 Computer	🌗 Franklin_TN	2/11/2019 4:00 PM	File folder				
🚢 Local Disk (C:)	퉬 Golden_CO	2/11/2019 4:00 PM	File folder				
	퉬 Houston_TX	2/11/2019 4:00 PM	File folder				
	퉬 Irvine_CA	2/11/2019 4:00 PM	File folder				
	퉬 KingOfPrussia_PA	2/11/2019 4:00 PM	File folder				
	\mu Lewiston_ID	2/11/2019 4:00 PM	File folder				
	🌗 Orlando_FL	2/11/2019 4:00 PM	File folder				
	🌗 Provo_UT	2/11/2019 4:00 PM	File folder				
	🌗 Pullman_WA	2/11/2019 4:00 PM	File folder				
	鷆 SanLuisPotosi_MX	2/11/2019 4:00 PM	File folder				
	🌗 Spokane_WA	2/11/2019 4:00 PM	File folder				
	3 StLouis_MO	2/11/2019 4:00 PM	File folder				
📮 Network	🍑 Vacaville_CA	2/11/2019 4:00 PM	File folder				
	Vancouver BC	2/11/2019 4:00 PM	File folder				

SynchroWAVe SWAVE Database Example

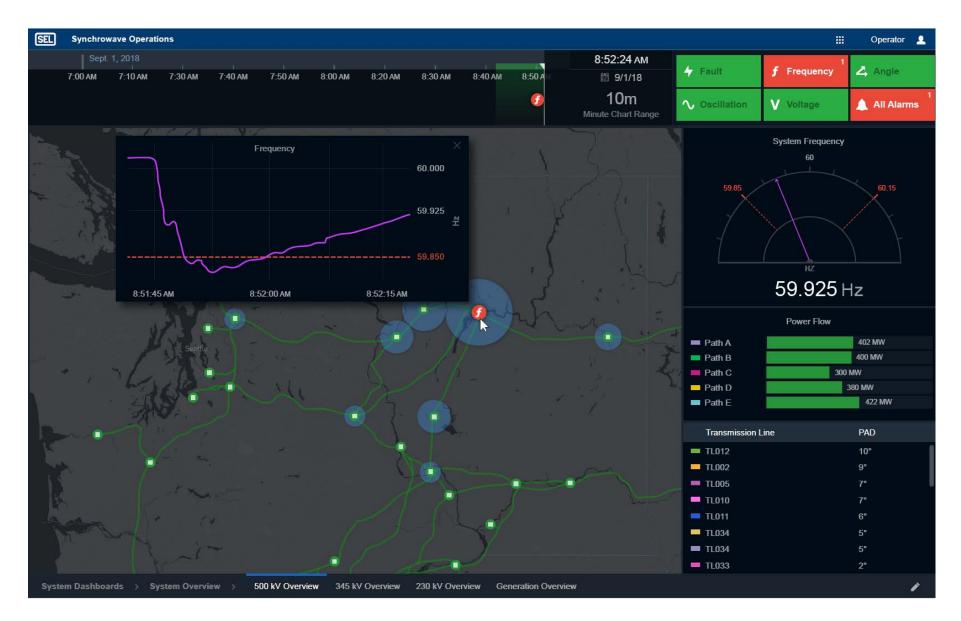
			👻 🍫 Search Atlant	a_GA	
Organize 🔻 New folder					
🛠 Favorites	Name	Date modified	Туре	Size	
Desktop	🕤 190211,00000000000,0,Atlanta_GA,Raw,.swave	2/11/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
Downloads	🕤 190210,00000000000,0,Atlanta_GA,Raw,.swave	2/10/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
Recent Places	🕤 190209,00000000000,0,Atlanta_GA,Raw,.swave	2/9/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
2 Recent Places	😒 190208,00000000000,0,Atlanta_GA,Raw,.swave	2/8/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	😒 190207,00000000000,0,Atlanta_GA,Raw,.swave	2/7/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190206,00000000000,0,Atlanta_GA,Raw,.swave	2/6/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190205,00000000000,0,Atlanta_GA,Raw,.swave	2/5/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190204,00000000000,0,Atlanta_GA,Raw,.swave	2/4/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190203,00000000000,0,Atlanta_GA,Raw,.swave	2/3/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	😒 190202,00000000000,0,Atlanta_GA,Raw,.swave	2/2/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
💺 Computer	190201,00000000000,0,Atlanta_GA,Raw,.swave	2/1/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
Local Disk (C:)	😒 190131,00000000000,0,Atlanta_GA,Raw,.swave	1/31/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	😒 190130,00000000000,0,Atlanta_GA,Raw,.swave	1/30/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190129,00000000000,0,Atlanta_GA,Raw,.swave	1/29/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190128,00000000000,0,Atlanta_GA,Raw,.swave	1/28/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190127,00000000000,0,Atlanta_GA,Raw,.swave	1/27/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190126,00000000000,0,Atlanta_GA,Raw,.swave	1/26/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190125,00000000000,0,Atlanta_GA,Raw,.swave	1/25/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	State 190124,00000000000,0,Atlanta_GA,Raw,.swave	1/24/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	S 190123,00000000000,0,Atlanta_GA,Raw,.swave	1/23/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	190122,00000000000,0,Atlanta_GA,Raw,.swave	1/22/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
	S 190121,00000000000,0,Atlanta_GA,Raw,.swave	1/21/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
陣 Network	State 190120,0000000000,0,Atlanta_GA,Raw,.swave	1/20/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	
TVELWOIK	190119,00000000000,0,Atlanta GA,Raw,.swave	1/19/2019 4:00 PM	SEL SWave Synchrophasor Data File	101,251 KB	

Offline availability: Not available

SynchroWAVe SWAVE Database Example

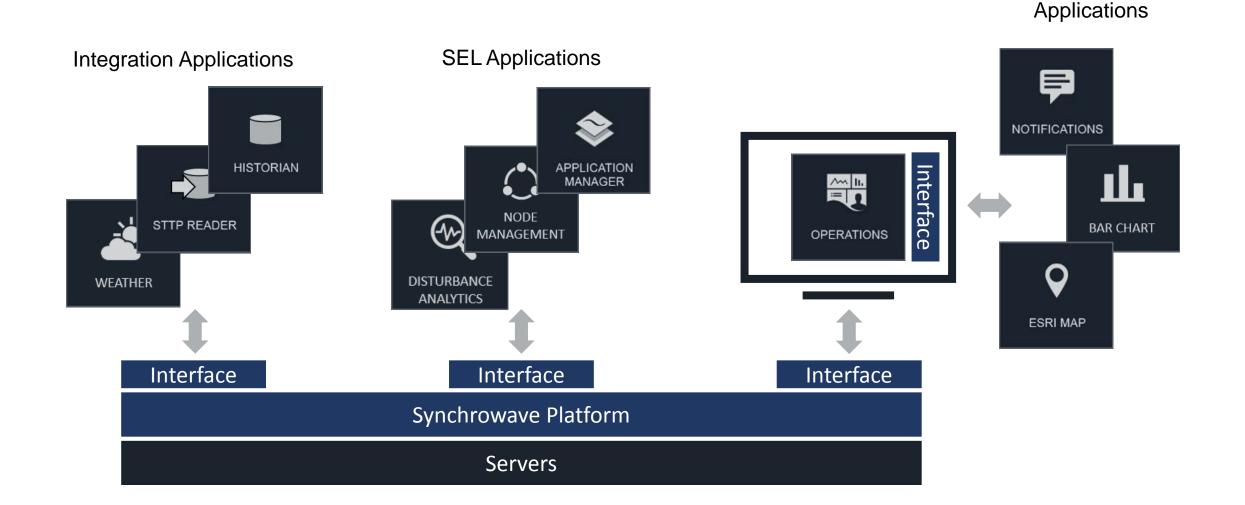
File						
itation Name: AtlantaGA	Station ID: 3	303 Message Rate: 60	MsgPerSec Nominal Fre	quency: 60 🔲 'The Ma	trix' Mode Time Search:	
Timestamp	Status	V1PM:M(V)	V1PM:Ang	Frequency	DFrequency	
2019-02-11 00:00:00.000	Good	121.220504760742	163.405639648438	60.0039291381836	-0.00789999961853027	
2019-02-11 00:00:00.016	Good	121.21028137207	163.432662963867	60.0045051574707	-0.00824000034481287	
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2019-02-11 00:00:00.233	Good	121.172546386719	163.814910888672	60.0058059692383	0.0100600002333522	
2019-02-11 00:00:00.250	Good	121.169548034668	163.849670410156	60.0057907104492	0.00651000021025538	
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2019-02-11 00:00:00.300	Good	121.187194824219	163.929489135742	60.0044937133789	-0.0036599999293685	
2019-02-11 00:00:00.316	Good	121.185256958008	163.957717895508	60.0047035217285	-0.00124000001233071	
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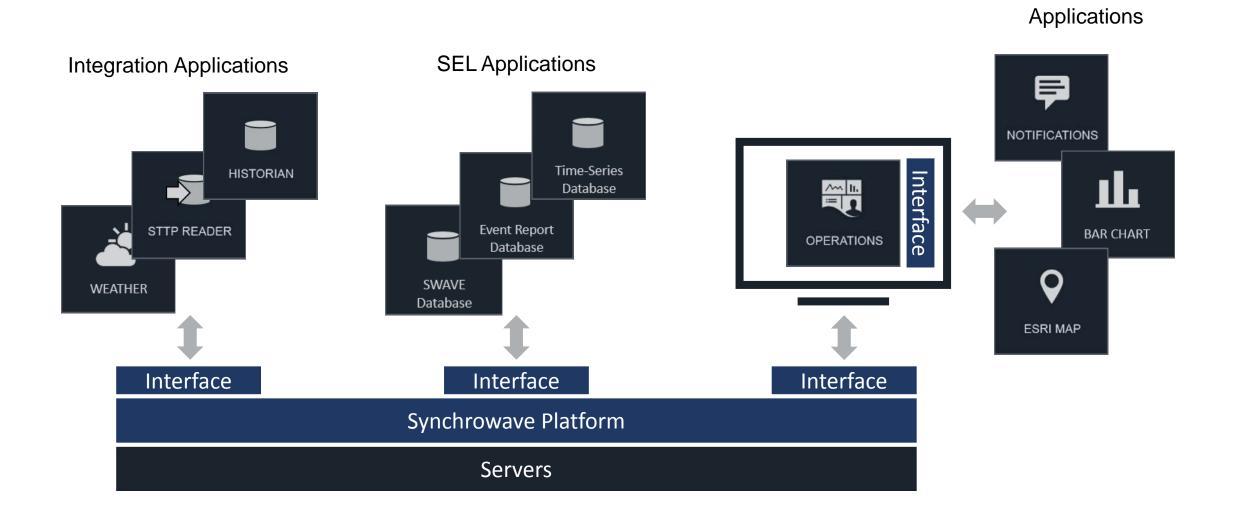
Open Application Platform

Develop, Integrate, Customize.



SEL and Custom

Integrate Multiple Database Applications



SEL and Custom

Thank You!