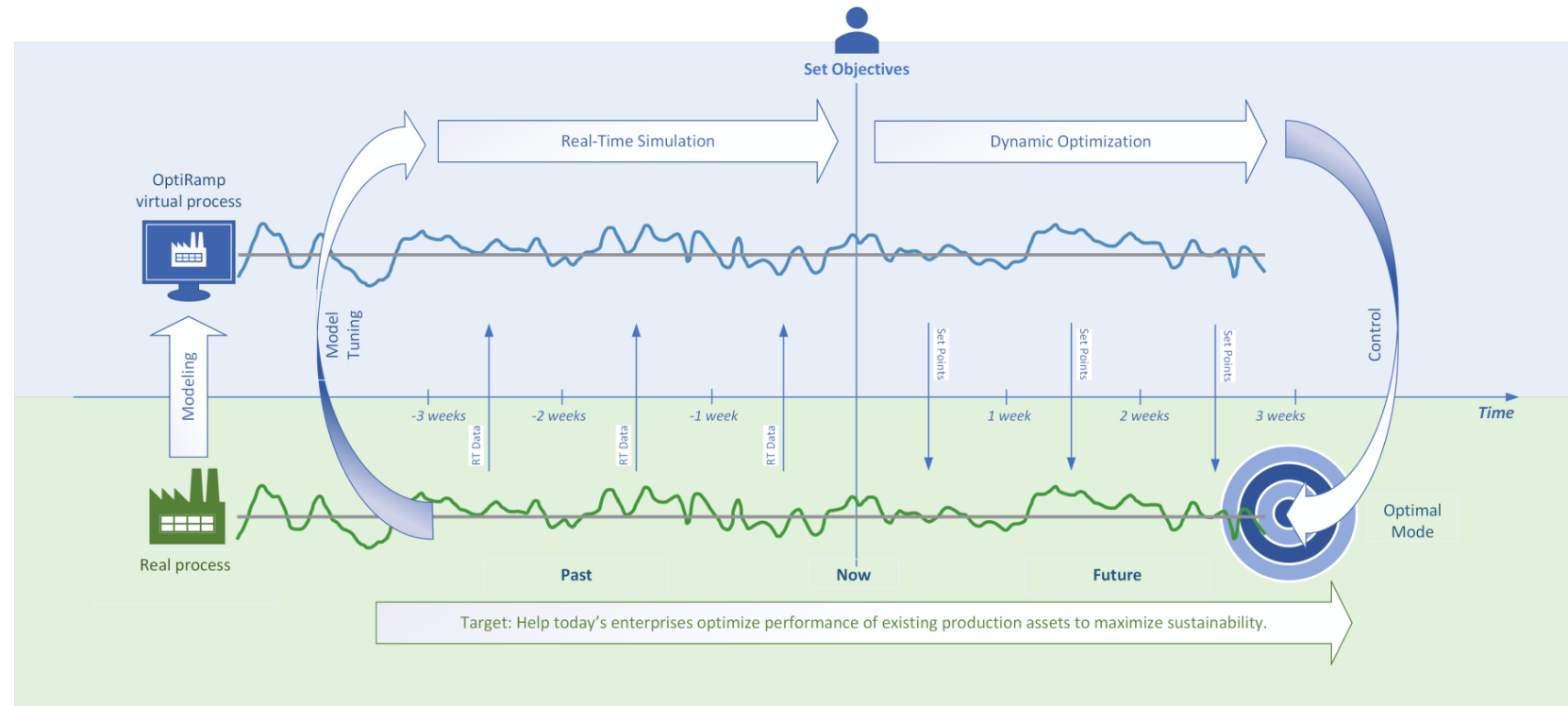# Auto-Tuning

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Auto-Tuning in *OptiRamp*

- Main purpose is to maintain accuracy of simulated data with respect to live data
- The precision works by applying selected signal processing, optimization, and statistical process control algorithms
- Equipment performance, production demands, process, and ambient conditions fluctuate and determining correction coefficients can be difficult to maintain accuracy
- OptiRamp solves this problem by creating a virtual process that runs in parallel to the actual process and mimics it in real-time

OptiRamp Auto-Tuning Concept
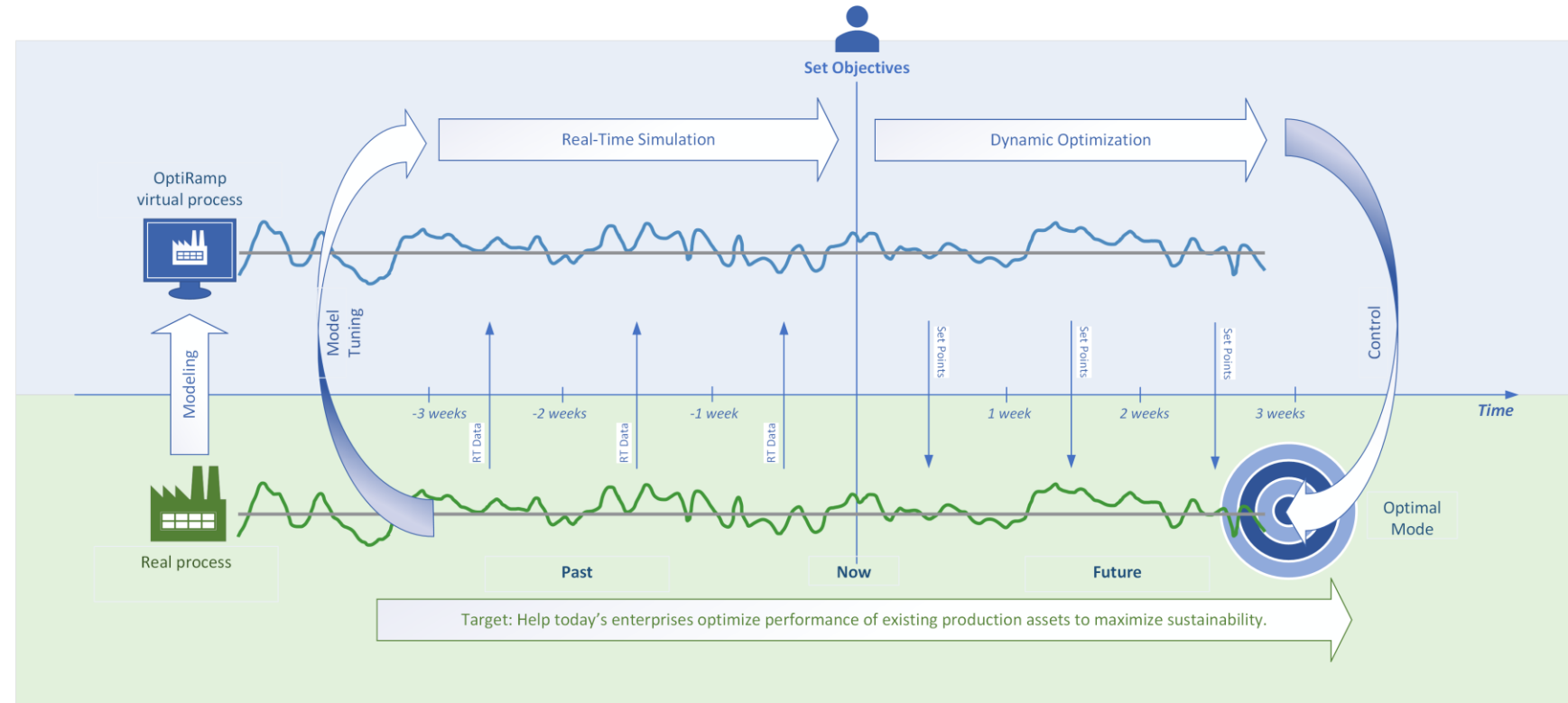
Left side of figure

- Virtual process adjusts initial process
- Auto-tunings purpose is to minimize virtual process to real process
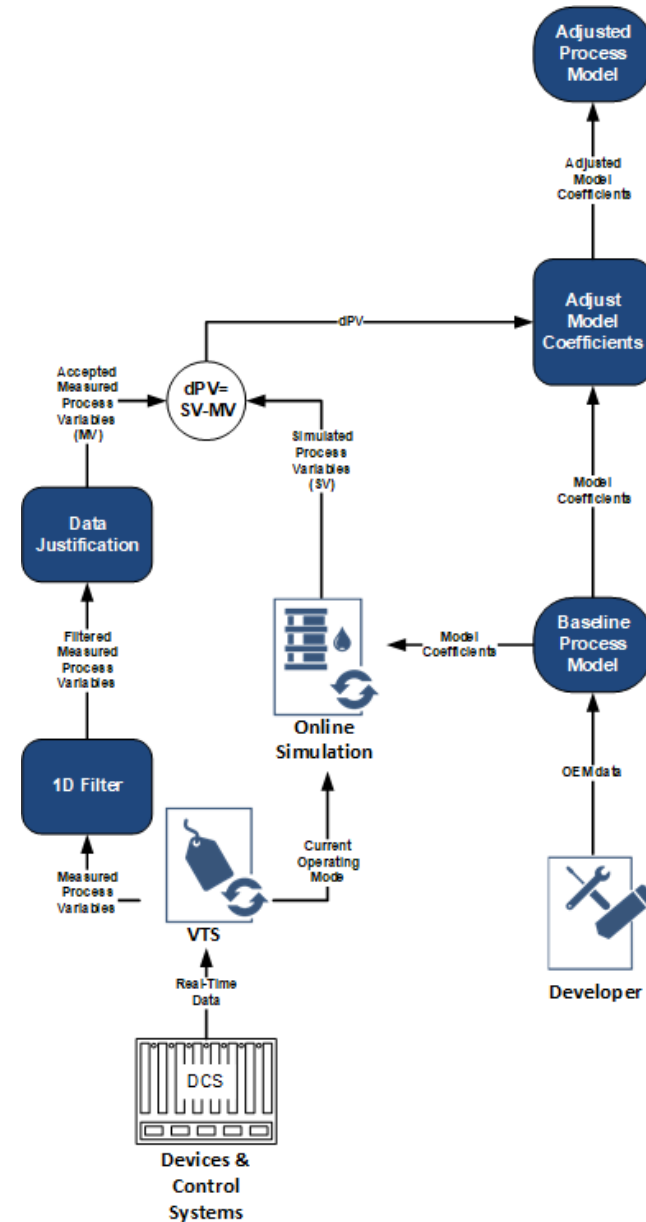
OptiRamp Auto-Tuning Concept

Right side of figure

- Uses adjusted model to determine current and future optimal operating mode
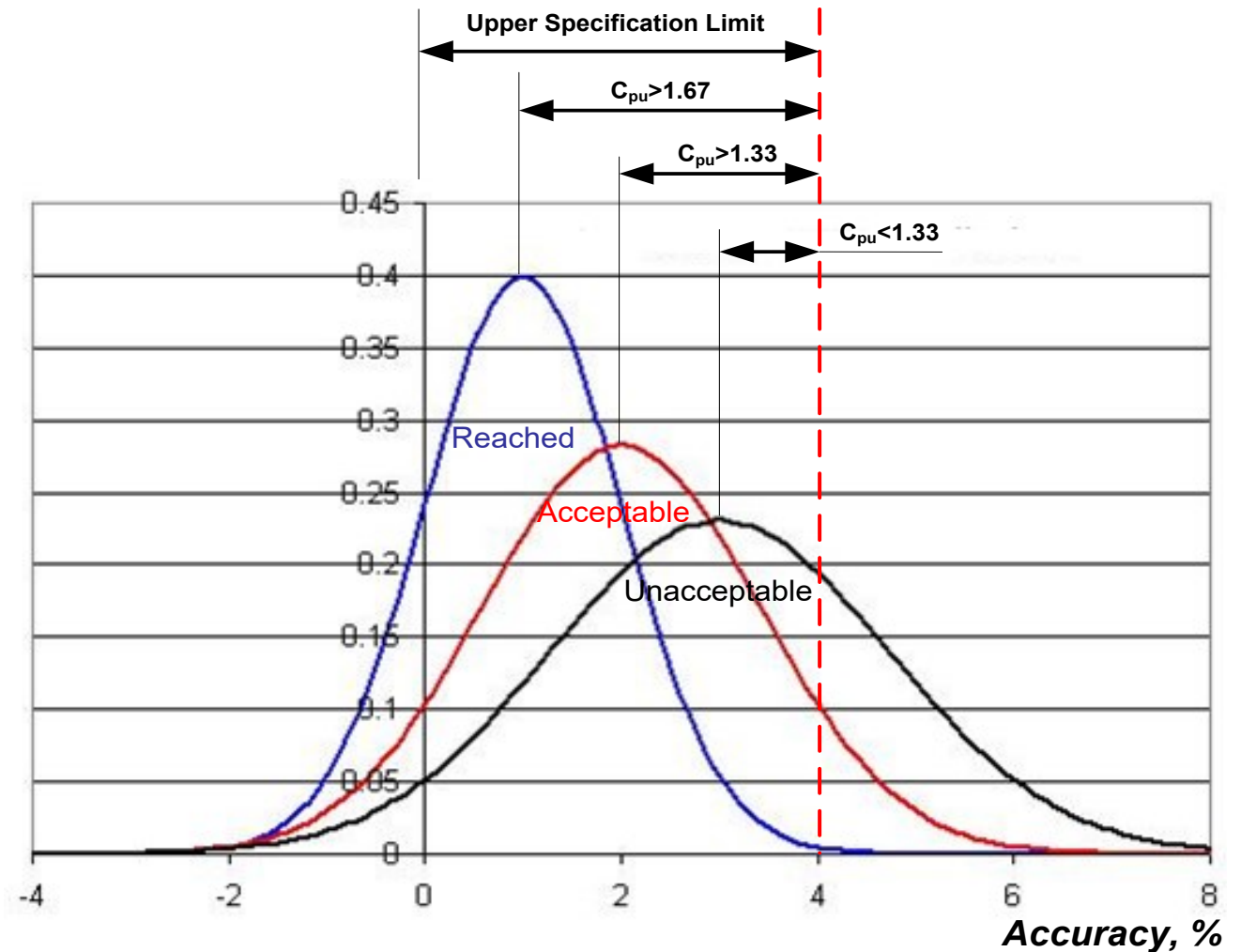- Works with Optimization, MVPC, Forecast, and Planning

Auto-Tuning Architecture

- Connects to live data through VTS
- Filters live data with 1D filter and justifies data to ensure good data is used in the model
- Runtime simulation starts with OEM data
- Auto-tuning adjusts coefficients automatically to achieve accurate adjusted model

Auto-Tuning Running

- Can choose upper specification limit for accuracy
- OptiRamp continues adjusting until limit is reached
- Corrects bad model parameters
- Improve accuracy to > 99% without human intervention

Auto-Tuning Accuracy

- Shows the live data (green text) and simulated data (blue text) and how close they run together
- Goal is to get the model under 1% in accuracy

Model/Object	Accuracy (%)	Value Fld	Value Sim	Weight
Auto-Tuning Model	1.3%	USL: 1	Cpu: -1.19235 Unacceptable	
P : PIT1801A5	1.8	11	12	1
P : PIT1801A3	0.7	445	448	1
M : FIT1801A	1.9	42141	42986	1
P : PIT1801B5	0.4	12	13	1
P : PIT1801B3	0.1	443	450	1
M : FIT1801B	1.3	43985	44011	1
P : PIT1801D5	1.3	11	12	1
P : PIT1801D3	0.9	440	441	1
M : FIT1801D	1.8	43546	43764	1
P : PIT1802	0.8	426	431	1
M : FIT1804	-0.9	152744	151984	1

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Auto-Tuning Island

- Shows the live data (green line) and simulated data (blue line) and how close they run together