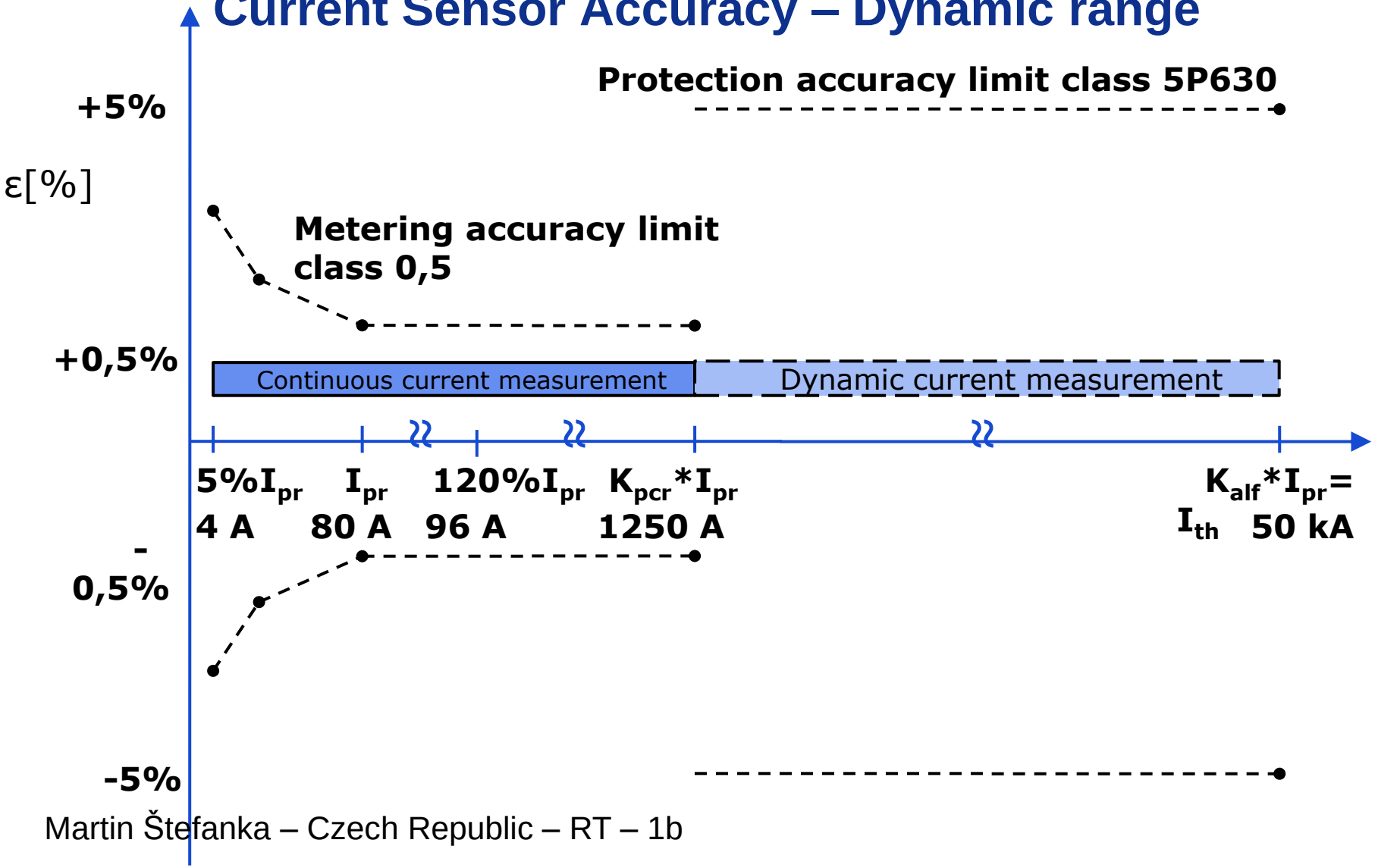
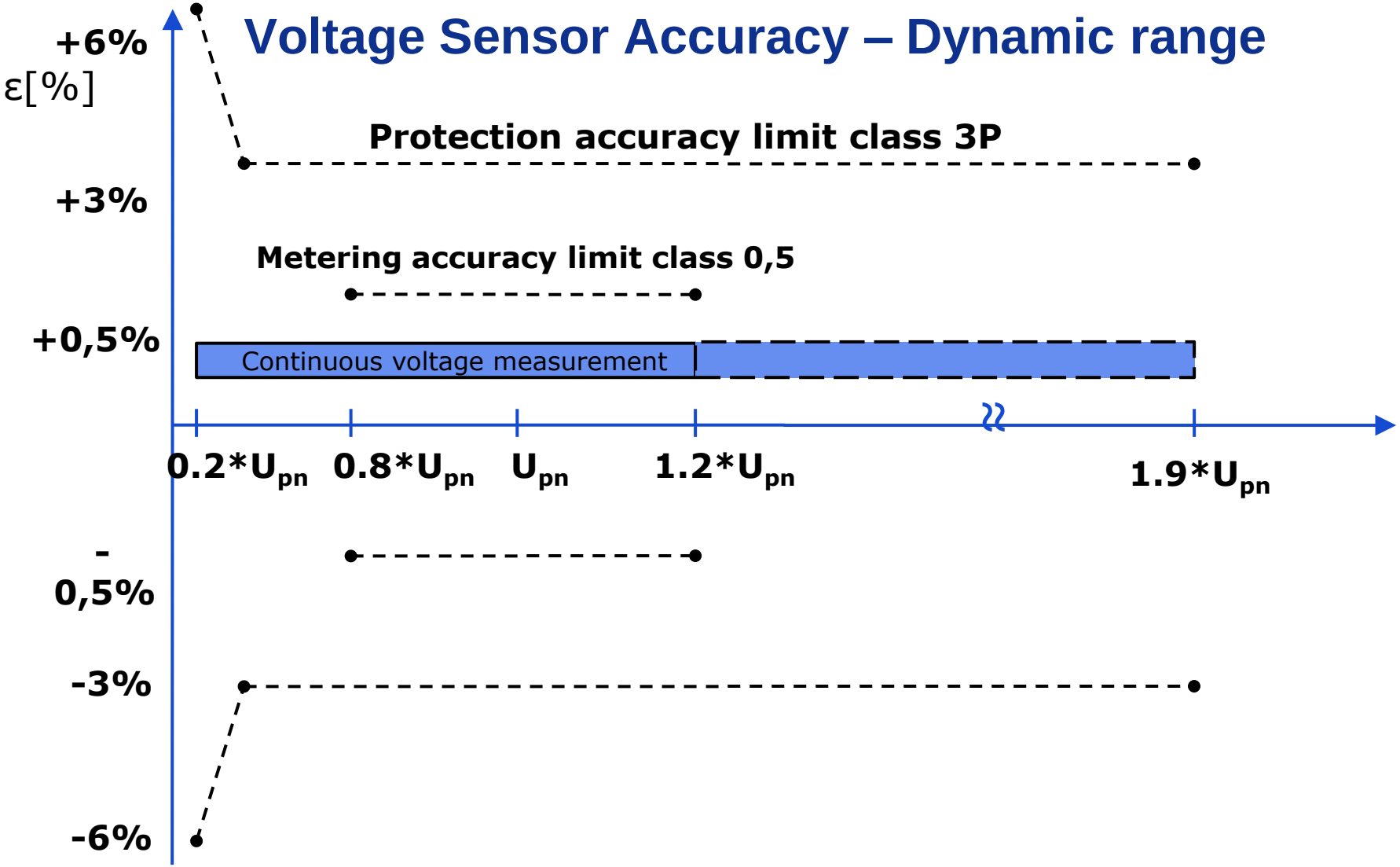
Agenda

- Comparisons of accuracy measurement dynamics ranges of sensors and instrument transformers
- Reliability of the sensors (PDs, Ferrorensonance, simplicity)
- Protection system engineering simplicity with sensors
- Merging unit with IEC 61850-9-2, Interface from sensors to protection and control system
- Algorithms of protection functions and new possible protection schemes

Current Sensor Accuracy – Dynamic range



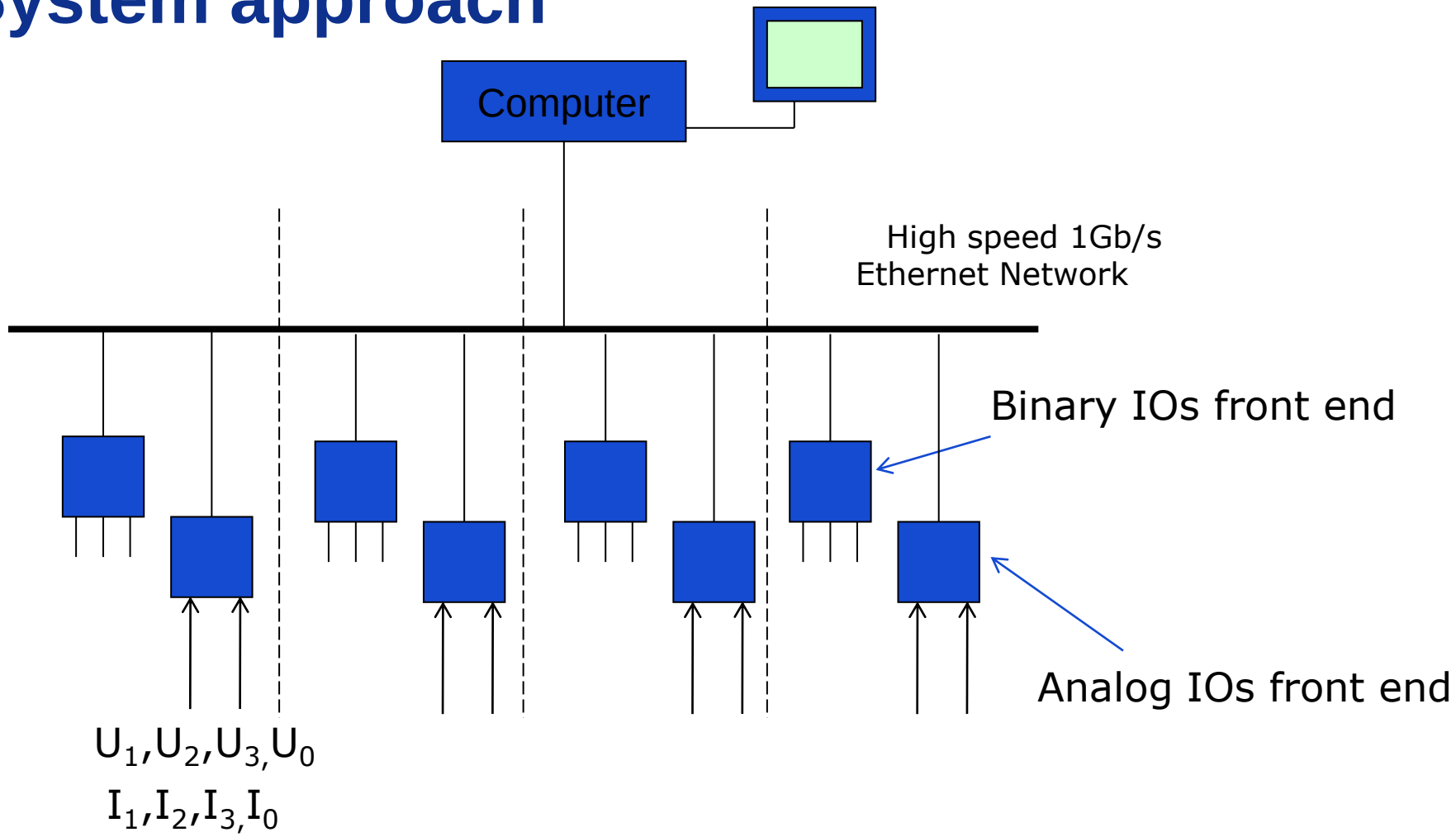
Voltage Sensor Accuracy – Dynamic range



Reliability of the Sensors

- Sensors do not fail
  - No Partial Discharge effect
  - Very limited aging
  - No ferroresoance effect
  - Wrong connection of secondary side impossible

System approach



Comparison of traditional vs. sensors system

	Traditional approach	Full use of IEC 61850
IEDs	High amount of IOs	Small amount of IOs
	High amount of AI	Less AIs needed
	Power full processors and DSP	Processing capacity move to FPGA
MV Switchgears	Requires lot of engineering	Engineering can be standartize
	Includes over engineered ITs	Light sensors can be used
	Number of IOs is defined by IED	Number of virtual IOs "unlimited"
	Includes large amount of wires	Limited wiring
Protection and control approach	Decantralized	Combination of centralized and decentralized
	Back up solution is expensive	Back up solution always given
	Limited use of BB diferential prot.	Easy to us BB diferential protection