

# Logging CDCs specified in R1-9 and logging model as defined in the ACSI

April 03, 2003  
R0-2

# Content of the presentation

- **Logging CDCs in R1-9**
- **Observation**
- **Motivation for optimisation**
- **Example**
- **QueryLog services**
- **Summary**
- **Next steps**

# Logging in current draft (R1-9)

## LN WTUR

TotPwrAt	ANA
TotPwrRt	ANA

WPP5/ WTUR.TotPwrAt  
WPP5/ WTUR.TotPwrRt

## CDC ANA (analogue value)

ANA class		
Attribute Name	Attribute Type	Explanation and Value / Range
DataName	Inherited from Data Class (see IEC 61850-7-2)	
DataAttribute		
<i>analogue information</i>		
instVal	AnalogueValue	Instantaneous value
avgVal	AnalogueValue	Average value
rmsVal	AnalogueValue	Root-mean-square value (effective)
anId	INT16U	Identifier of quantity
t	TimeStamp	Time value
q	Quality	Quality

## CDC ANL (analogue log)

ANL class					
Attribute Name	Attribute Type	FC	TrgOp	Explanation and Value / Range	M/O
DataName	Inherited from Data Class (see IEC 61850-7-2)				
DataAttribute					
<i>historical information</i>					
anLg	PACKEDLIST [Nan]	AnP		Log containing historical analogue values	M
anId	INT16U	AnP		Identifier of analogue variable	M
anDat	PACKEDLIST [Nlg]	AnP		Analogue data	M
anVal	AnalogueValue	AnP		Analogue value	M
t	TimeStamp	AnP		Time	M
q	Quality	AnP		Quality	O
tSmp	FLOAT32	AnP		Sample time	O
Nan	INT8U	LgM		Number of analogue variables	M
Nlg	INT32U	LgM		Number of loggings	M
strPtrLg	INT32U	LgM		Pointer to oldest logging	M
endPtrLg	INT32U	LgM		Pointer to newest logging	O
<i>state information</i>					
lgStt	CODED ENUM	LgM	dchg	Actual log state value Empty   Running   Ready   Error	M
<i>control information</i>					
setAnId	INT16U [Nan]	CfC		Set analogue quantities	O
setLgMod	CODED ENUM	CmC	dchg	Set operation mode of log Cont. run   Single run   Evt run   Stop   Clear	O
smpMul	INT8U	CfC		Multiplication factor for base sample time	O
trgEvid	INT16U	CfC		Identifier for event triggered run	O
<i>description and extension information</i>					
unit	Unit [Nan]	DcT		SI-unit	M
dLg	Description	DcT		Textual description of log	O
cdcNs	VISIBLE STRING255	ExT		CDC name space	M
Services					
NOTE: If time, quality or sample time will be the same for a log, then scalar dimension satisfies.					

## Ref to anId mapping

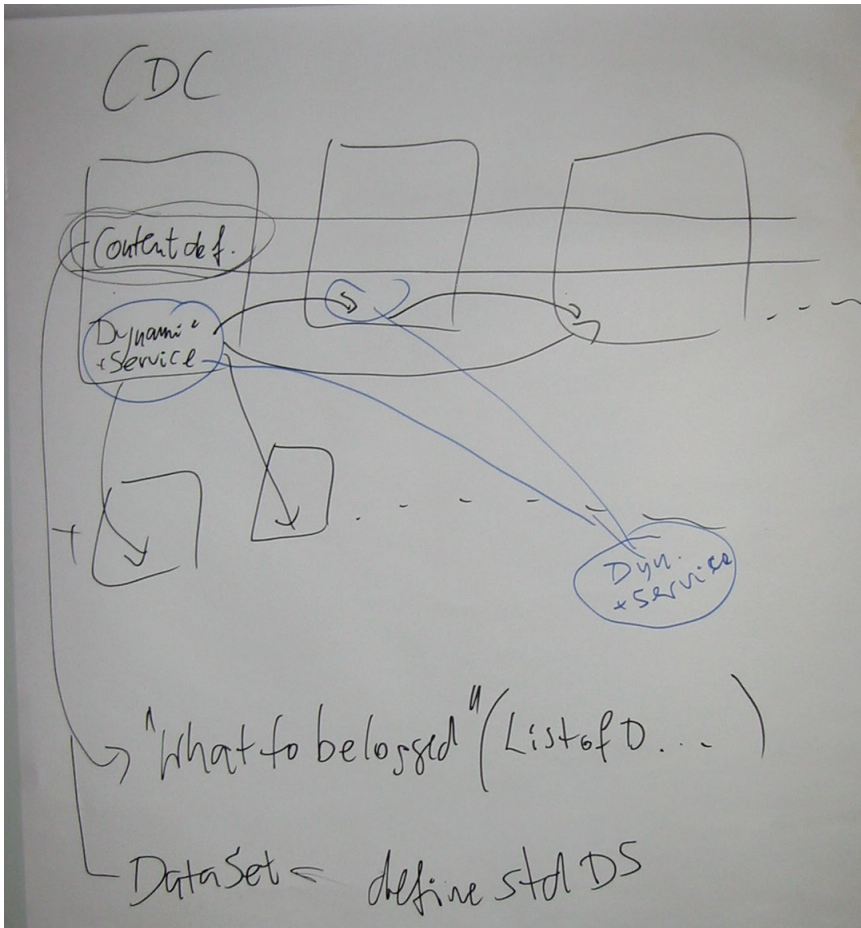
anId	DataAttributeReference	anDat
33	WPP5/WTUR.TotPwrAt.instVal.f	
55	WPP5/WTUR.TotPwrRt.instVal.f	

t	anId	anVal	q
t <sub>1</sub>	33	244.9	good
t <sub>2</sub>	33	244.4	good
t <sub>3</sub>	55	645.5	good
t <sub>4</sub>	33	243.5	good
t <sub>5</sub>	55	644.6	good

logged data values

t

# Observation



Hamburg, March 27, 2003

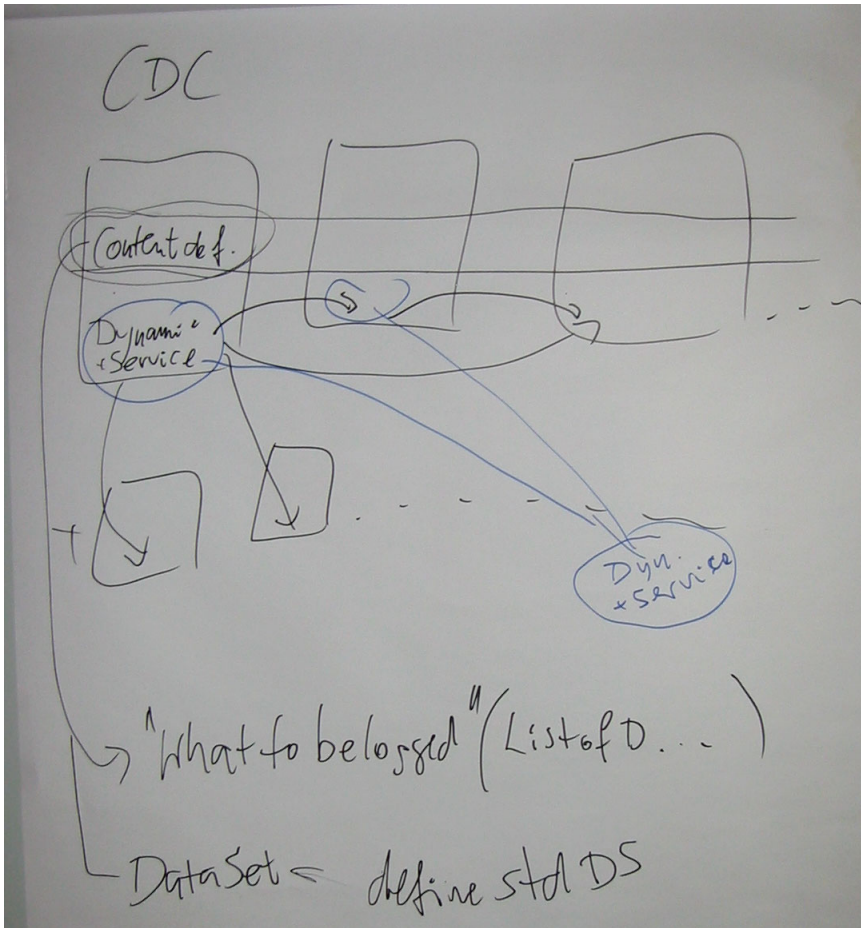
- current CDCs can be further optimised
- structure of content of the log is complex, e.g. for CDC ANL:

```

anLg Array [Nan] of Structure
  {anId
   anDat Array [Nlg] of Structure
     {anVal
      t
      q}}
Nan
Nlg
strPtrLg
endPtrLg
...

```

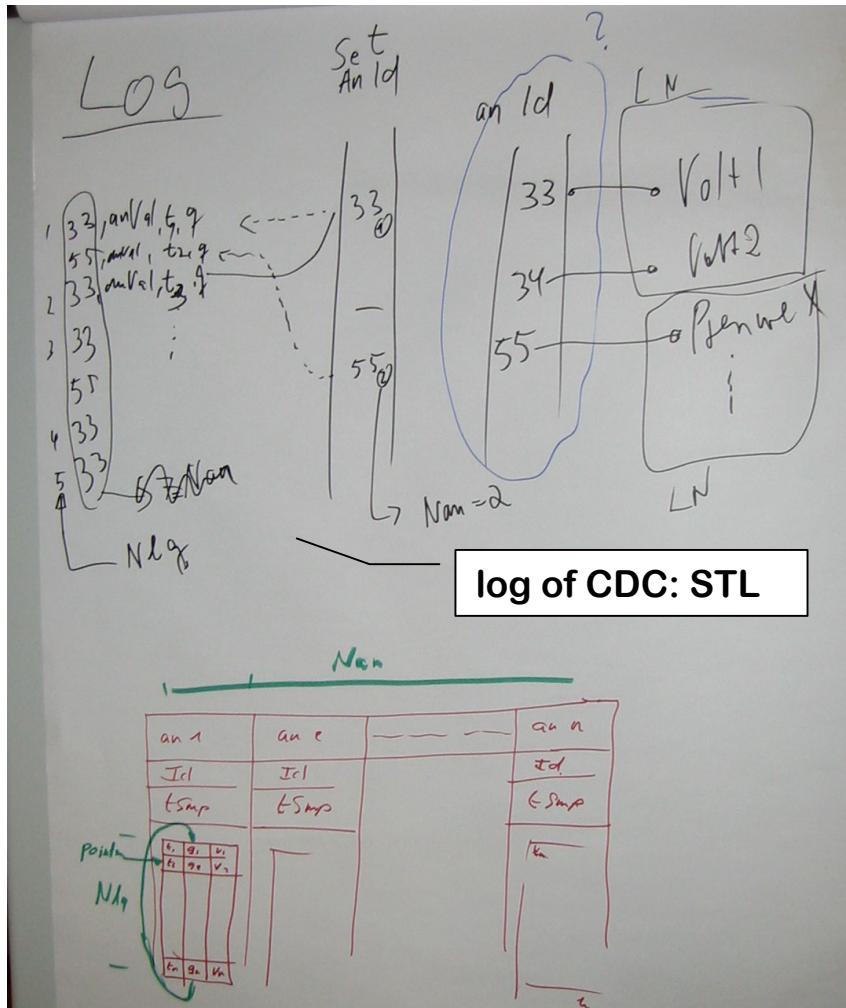
# Observation



Hamburg, March 27, 2003

- **optimise the current log CDCs**
- **extract the fixed content definition** (standardized highly structured information) **and define standardized DataSets instead**
- **DataSet approach is more flexible;** does not require new CDCs when additional data to be logged
- **extract dynamics/service from each CDC (not yet defined) and define it once in a separat class -> result is comparable with the existing ACSI log model** (some details may have to be added to the ACSI log model)

# Approach



Hamburg, March 27, 2003

- Use “path name” for data (e.g., for “Volt1”) to be logged
- “anId” not required because we want to use the “path name” (be aware that internally - in the software - the “path name” may be represented as optimised pointers)
- “SetAnId” becomes the standardized DataSet (list of pointers to all Data to be logged)
- log contains the value, time stamp, and quality information

# Generic ACSI LOG and LCB

LCB (LogControlBlock)

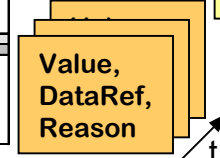
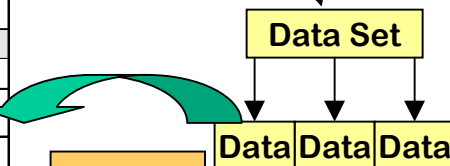
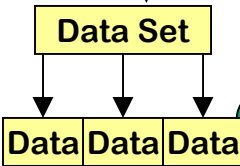
LCB

LCB class				
Attribute name	Attribute type	FC	TrgOp	Value/value range/explanation
LCBName	ObjectName	-	-	Instance name of an instance of LCB
LCBRef	ObjectReference	-	-	Path-name of an instance of LCB
Specific to log handler				
LogEna	BOOLEAN	LG	dchg	
DatSet	ObjectReference	LG	dchg	
TrgOp	TriggerConditions	LG	dchg	Valid values for TrgOp of type TriggerConditions shall be dchg, qchg, dupd, and integrity.
IntgPd	INT32U	LG	dchg	1..MAX; 0 implies no integrity logging.
Specific to building the log				
LogRef	ObjectReference	LG		
<b>Services</b>				
GetLCBValues SetLCBValues				

LCB class				
Attribute name	Attribute type	FC	TrgOp	Value/value range/explanation
LCBName	ObjectName	-	-	Instance name of an instance of LCB
LCBRef	ObjectReference	-	-	Path-name of an instance of LCB
Specific to log handler				
LogEna	BOOLEAN	LG	dchg	
DatSet	ObjectReference	LG	dchg	
TrgOp	TriggerConditions	LG	dchg	Valid values for TrgOp of type TriggerConditions shall be dchg, qchg, dupd, and integrity.
IntgPd	INT32U	LG	dchg	1..MAX; 0 implies no integrity logging.
Specific to building the log				
LogRef	ObjectReference	LG		
<b>Services</b>				
GetLCBValues SetLCBValues				

LOG

LOG class			
Attribute name	Attribute type	FC	Value/value range/explanation
LogName	ObjectName		Instance name of an instance of LOG
LogRef	ObjectReference		Path-name of an instance of LOG
OldEntrTm	TimeStamp	LG	
NewEntrTm	TimeStamp	LG	
OldEntr	EntryID	LG	
NewEntr	EntryID	LG	
Entry [1..n]			
TimeOfEntry	EntryTime		
EntryID	EntryID		
EntryData [1..n]			
DataRef	ObjectReference		
Value	(*)		(*) type(s) depend on the definition of common data classes in IEC 61850-7-3
ReasonCode	TriggerConditions		ReasonCode general-interrogation shall never occur as TRUE. OPTIONAL
<b>Services</b>			
QueryLogByTime QueryLogAfter GetLogStatusValues			



# Specific LOG and LCB

LCB "ANLcb"

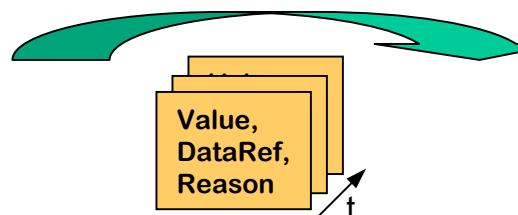
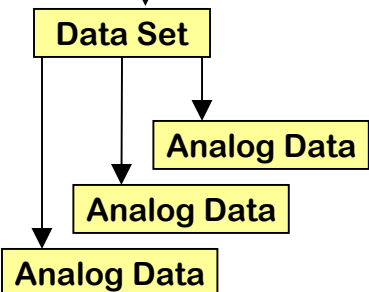
e.g., logging of analogue values

LCB class					
Attribute name	Attribute type	FC	TrgOp	Value/value range/explanation	
LCBName	ANLcb	ObjectName	-	-	Instance name of an instance of LCB
LCBRef	WPP5/LLN0.ANLcb	ice	-	-	Path-name of an instance of LCB
Specific to log handler					
LogEna	TRUE	BOOLEAN	LG	dchg	
DatSet	ANL	ObjectReference	LG	dchg	
TrgOp	dchg	TriggerConditions	LG	dchg	Valid values for TrgOp of type TriggerConditions shall be dchg, qchg, dupd, and integrity.
IntgPd	0	INT32U	LG	dchg	1..MAX; 0 implies no integrity logging.
Specific to building the log					
LogRef	ANLog	ObjectReference	LG		
<b>Services</b>					
GetLCBValues					
SetLCBValues					

LOG "TurAnLg"

LOG class			
Attribute name	Attribute type	FC	Value/value range/explanation
LogName	ObjectName		Instance name of an instance of LOG
LogRef	WPP5/WALG.TurAnLg		Path-name of an instance of LOG
OldEnTrTm	current value	amp	LG
NewEnTrTm	current value	amp	LG
OldEnTr	current value		LG
NewEnTr	current value		LG
Entry [1..n]			
TimeOfEntry	EntryTime		
EntryID	EntryID		
EntryData [1..n]			
DataRef	ObjectReference		
Value	(*)		(*) type(s) depend on the definition of common data classes in IEC 61850-7-3
ReasonCode	TriggerConditions		ReasonCode general-interrogation shall never occur as TRUE. OPTIONAL
<b>Services</b>			
QueryLogByTime			
QueryLogAfter			
GetLogStatusValues			

DataSet "ANL"



# Logging example

## LN WTUR

TotPwrAt	ANA
TotPwrRt	ANA

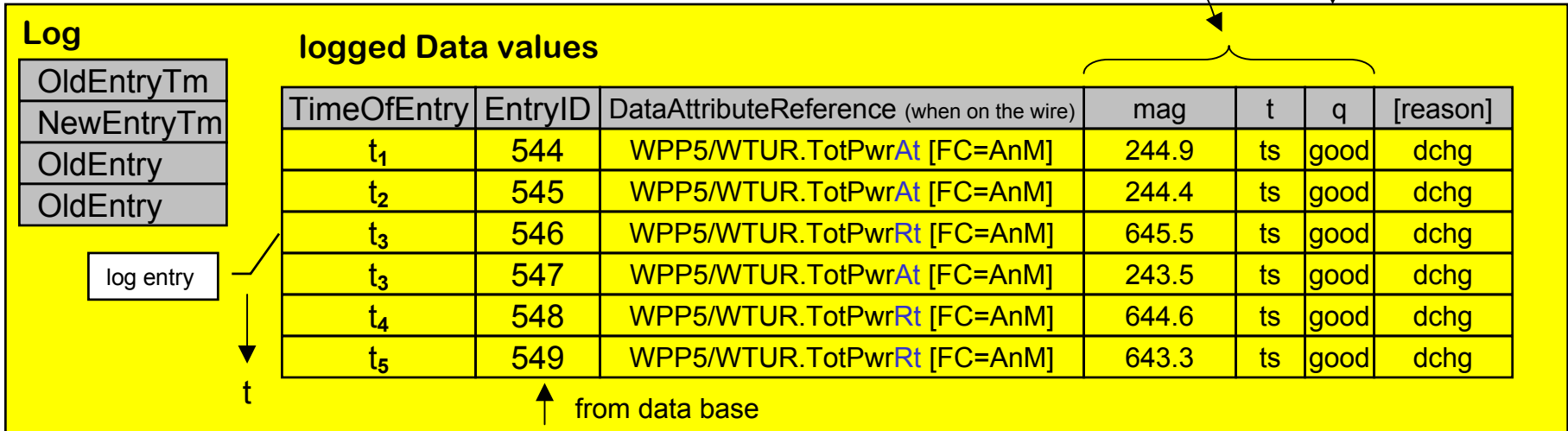
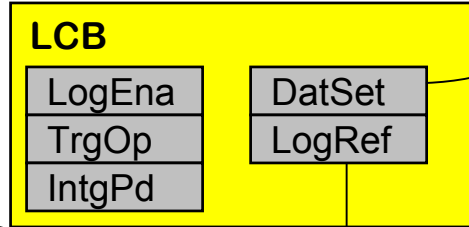
WPP5/ WTUR.TotPwrAt  
WPP5/ WTUR.TotPwrRt

## CDC ANA

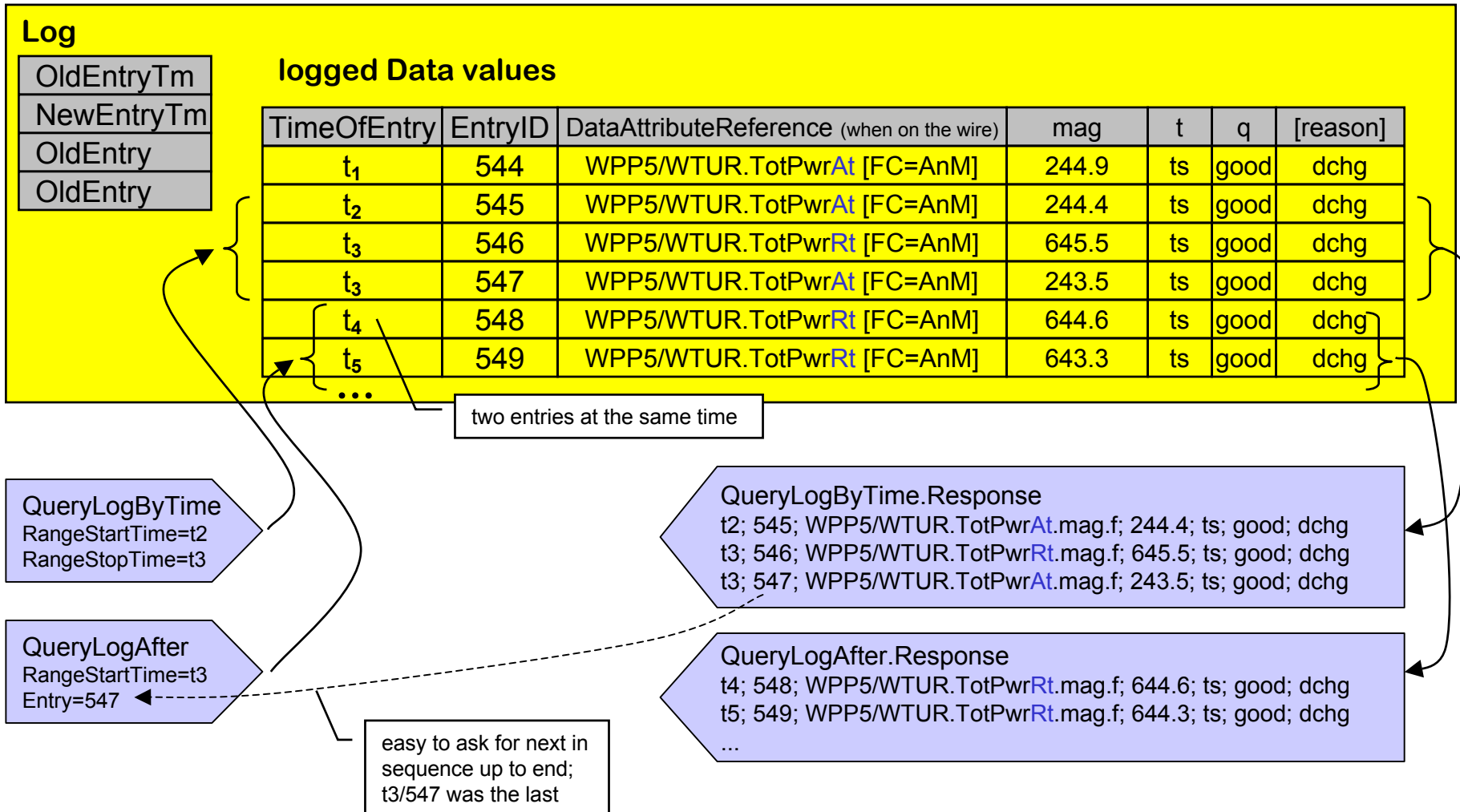
ANA class		
Attribute Name	Attribute Type	Explanation and Value / Range
DataName	Inherited from Data Class (see IEC 61850-7-2)	
DataAttribute		
<i>analogue information</i>		
instMag	AnalogueValue	Instantaneous value
mag	AnalogueValue	Deadbanded value
avgVal	AnalogueValue	Average value
rmsVal	AnalogueValue	Root-mean-square value (effective)
t	TimeStamp	Time value
q	Quality	Quality

## DataSet

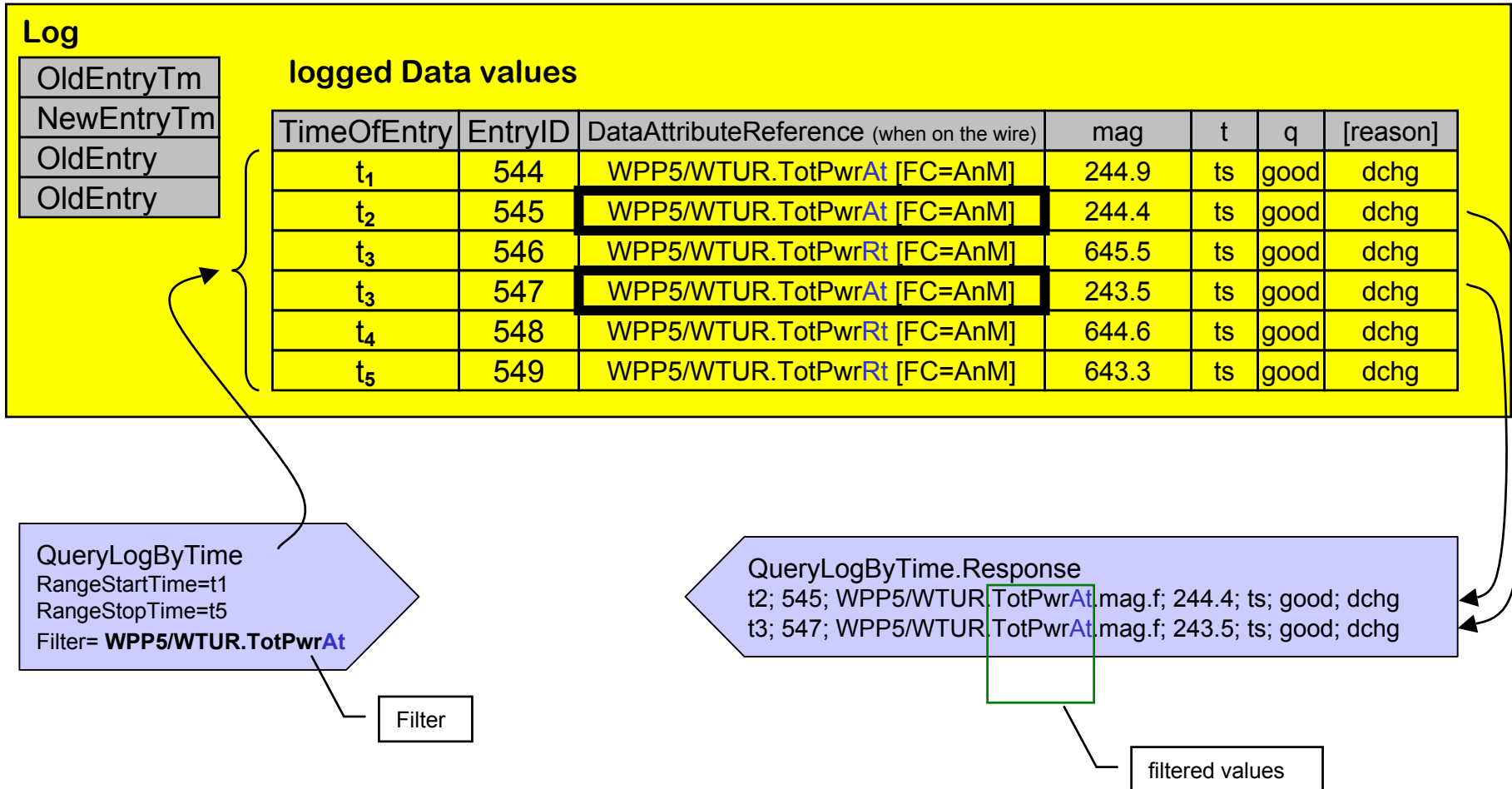
DataAttributeReference (when on the wire)	
WPP5/WTUR.TotPwrAt	[FC=AnM]
WPP5/WTUR.TotPwrRt	[FC=AnM]



# QueryLog services



# QueryLog service with filter



# CDC ANL replaced by ACSI

ANL class					
Attribute Name	Attribute Type	FC	TrgOp	Explanation and Value / Range	M/O
DataName	Inherited from Data Class (see IEC 61850-7-2)				
DataAttribute					
<i>historical information</i>					
anLg	PACKEDLIST [Nan]	AnP		Log containing historical analogue values	M
anId	INT16U	AnP		Identifier of analogue variable	M
anDat	PACKEDLIST [Nlg]	AnP		Analogue data	M
anVal	AnalogueValue	AnP		Analogue value	M
t	TimeStamp	AnP		Time	M
q	Quality	AnP		Quality	O
tSmp	FLOAT32	AnP		Sample time	O
Nan	INT8U	LgM		Number of analogue variables	M
Nlg	INT32U	LgM		Number of loggings	M
strPtrLg	INT32U	LgM		Pointer to oldest logging	M
endPtrLg	INT32U	LgM		Pointer to newest logging	O
<i>state information</i>					
lgStt	CODED ENUM	LgM	dchg	Actual log state value	M
				Empty   Running   Ready   Error	
<i>control information</i>					
setAnId	INT16U [Nan]	CfC		Set analogue quantities	O
setLgMod	CODED ENUM	CmC	dchg	Set operation mode of log	O
				Cont. run   Single run   Evt run   Stop   Clear	
smpMul	INT8U	CfC		Multiplication factor for base sample time	O
trgEvtId	INT16U	CfC		Identifier for event triggered run	O
<i>description and extension information</i>					
unit	Unit [Nan]	DcT		SI-unit	M
dLg	Description	DcT		Textual description of log	O
cdcNs	VISIBLE STRING255	ExT		CDC name space	M
Services					
NOTE: If time, quality or sample time will be the same for a log, then scalar dimension satisfies.					

ANL attributes map to ACSI models as follows:

- maps to (standard) log with name „TurAnLg“
- is DataAttributeReference (path name) - from ANA
- maps to log entries from one Data
- one log entry from one Data
- to be added to CDC ANA (configuration value)
- number of members in the DataSet (implicit)
- maps in MMS Journal to „current entries“ parameter
- these are attributes of the Log
- log is running at any time / LCB may be disabled
- maps to the standard DataSet of analogue data
- may be added to the log model if „Cont. run“ needed
- tSmp in CDC ANA could be the absolute value
- each DataAttribute has its own TrgOp
- already in CDC ANA
- may be added to the log model
- it is recommended not to change log model
- direct mapping
- needs specialization of log model

# Summary

- **The CDC ANL in R1-9 can be replaced by the ACSI models (standard) DataSet, (standard) LogControlBlock, and (standard) Log**
- **The services for QueryLog are already defined in the ACSI/MMS**
- **Minor specialisations can be added to the Log model in the ACSI (e.g., number of loggings in the Log)**
- **Several log CDCs (ANL, SPL, STL, ALL, and CML) can be replaced by this approach (providing the same functionality)**
- **Other CDCs (CHL, CTL, TML) can be replaced by standard DataSets (most attributes of these CDCs go into the corresponding CDCs ( CHL->CHA, CTL-CTE, ...))**

# Next steps

- **Based on this approach a complete replacement of the CDC ANL (of R1-9) will be provided today (April 2).**
- **Other log CDCs will be replaced by Friday (April 4).**

