Risk Management System

Based on FIX Protocol

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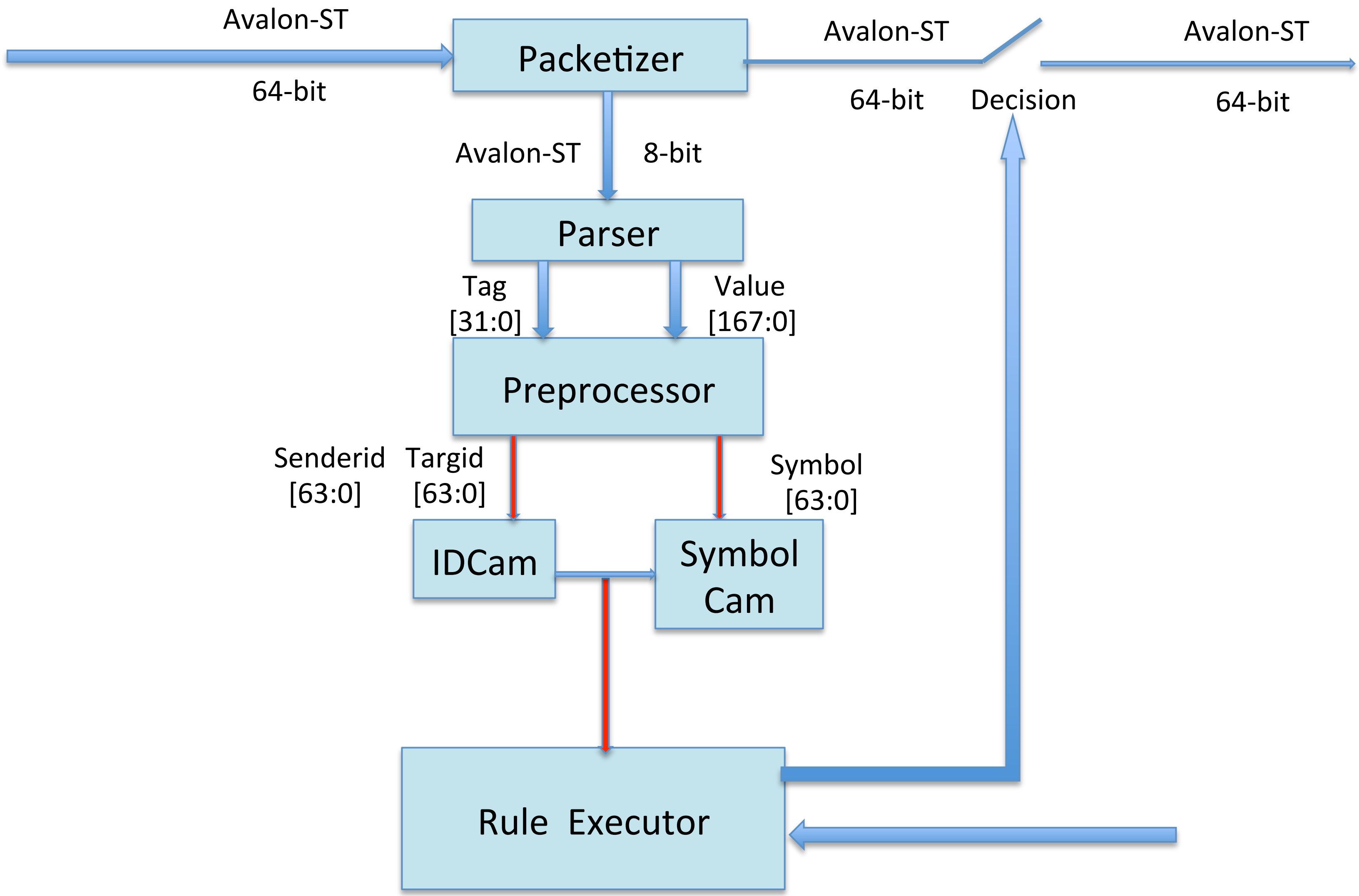
1 Motivation

- Risk existing in systems
- Hardware checking is faster and more stable than software

2 Rules to apply

- Maximum # of NewOrderSingle messages in one second
- Maximum quantity of contracts in one NewOrderSingle message
- Maximum quantity of floating contracts in the book

Uplink: from "me" to executor



Downlink: from executor back to "me"

Almost the symmetrical structure except for that the downlink packetizer will pass the message eventually.

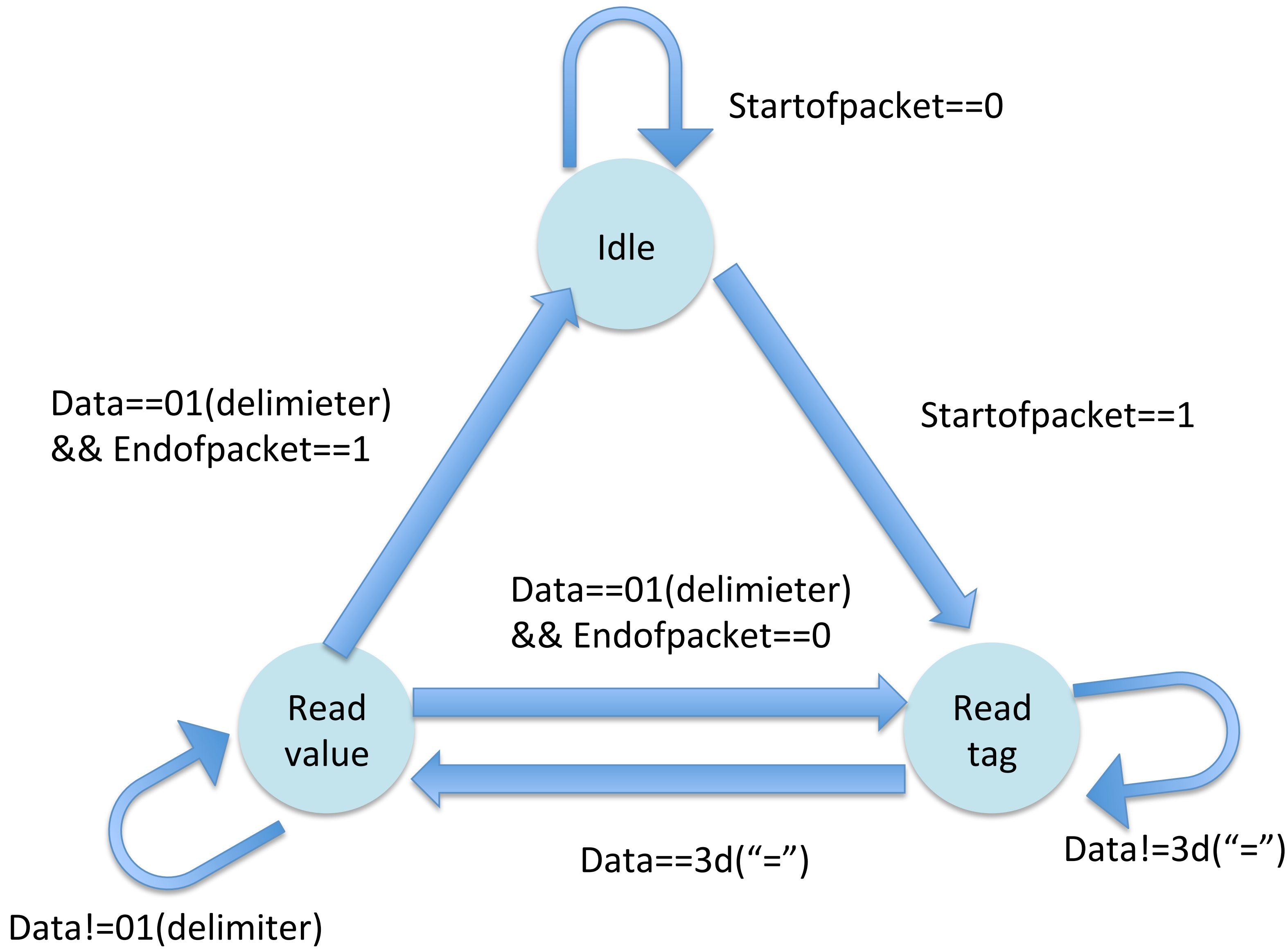
3.1 Packetizer

- ◆(operation)
- ◆Why 1 Byte/clk to parser is enough?

3.2 Parser

66-byte head for TCP/IP message|8=FIXT.1.1|9=131|35=D|34=61|49=MODI|
52=20140325-16:28:05.950|56=CME|11=1395764885886|21=1|38=400099|
40=1|54=1|55=YOKU|59=0|60=20140325-16:28:05.949|10=250|

FIX message format:
tag=value|tag=value|……|tag=value|


Startofpacket==0
Idle
Data==01(delimieter)
&& Endofpacket==1
Startofpacket==1
Data==01(delimieter)
&& Endofpacket==0
Read
value
Read
tag
Data==3d("=")
Data!=3d("=")
Data!=01(delimiter)

3.3 Preprocessor

NewOrderSingle (buy market)		
8=FIXT.1.1		
9=131		
35=D	**MsgType**	
34=61	**MsgSeqNum**	
49=BANZAI	**SenderCompID**	
52=20140325-16:28:05.950	**SendingTime**	
56=EXEC	**TargetCompID**	
11=1395764885886	ClOrdID	Unique identifier for Order as assigned by the buy-side (institution, broker, intermediary etc.) (identified by SenderCompID (49) or OnBehalfOfCompID (5) as appropriate). Uniqueness must be guaranteed within a single trading day. Firms, particularly those which electronically submit multi-day orders, trade globally or throughout market close periods, should ensure uniqueness across days, for example by embedding a date within the ClOrdID field.
21=1	HandInst	Instructions for order handling on Broker trading floor (1 = Automated execution order, private, no Broker intervention; 2 = Automated execution order, public, Broker intervention OK; 3 = Manual order, best execution)
38=1099	**OrderQty**	
40=1	**OrdType**	**Market/Limit/Stop/Stop Limit**
54=1	**Side**	**Buy/Sell/Sell Short/Sell Short Exempt/Cross…**
55=ACC	**Symbol**	
59=0	TimeInForce	Day/IOC/GTC…
60=20140325-16:28:05.949	**TransactTime**	
10=250		

Execution Report2		
8=FIXT.1.1		
9=149		
35=8	MsgType	
34=61	MsgSeqNum	
49=EXEC	SenderCompID	
52=20140325-16:28:06.032	SendingTime	
56=BANZAI	TargetCompID	
6=12.3	AvgPx	
11=1395764885886	ClordID	
14=1099	CumQty	Total quantity (e.g. number of shares) filled.
17=2	ExecID	Unique identifier of execution message as assigned by sell-side (broker, exchange, ECN) (will be 0 (zero) for ExecType (150)=I (Order Status)). Uniqueness must be guaranteed within a single trading day or the life of a multi-day order. Firms which accept multi-day orders should consider embedding a date within the ExecID field to assure uniqurness across days.
31=12.3	LastPx	
32=1099	LastQty	
37=2	OrderID	Unique identifier for Order as assigned by sell-side (broker, exchange, ECN). Uniqueness must be guaranteed within a single trading day. Firms which accept multi-day orders should consider embedding a date within the OrderID field to assure uniqueness across days.
38=1099		OrderQty
39=2	OrdStatus	New/Partially filled/Filled/Done for day/ Canceled
54=1	Side	
55=ACC	Symbol	
150=2	ExecType	Describes the specific ExecutionRpt (e.g. Pending Cancel) while OrdStatus(39) will always identify the current order status (e.g. Partially Filled)
151=0	LeavesQty	Quantity open for further execution. If the OrdStatus (39) is Canceled, DoneForTheDay, Expired, Calculated, or Rejected (in which case the order is no longer active) then LeavesQty could be 0, otherwise LeavesQty = OrderQty (38) - CumQty (14).
10=177		

3.4 IDcam & Symbolcam

- Hash ID combination and Symbol to give the address
- If illegal ID combination or Symbol, error recognized before rule executor

3.5 Rule Executors

- Apply the three rules
  Uplink & Downlink considerated

- Rules can be further extended
  e.g. different OrderTypes, Position, etc