State Devices
(The Untold Story)

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Introduction

- Public states of machines or equipment
  - 16 bit integer values
  - 0 state value always means “undefined”
  - most are simple integers, but some convey other information (e.g. node identifier values)
- Also act as “events”
  - used to overcome limitation of 256 clock events
- Exist as ACNET devices
  - names start with “V:”

State Monitoring

- Multicast on change
  - monitored by callbacks
- Polling
  - simply reading state's ACNET device
- Registered update
  - used by some front ends
  - supports passing of extra information
  - usage is discouraged

State Assertion

- Setting the state's ACNET device
  - most common method (used by the Sequencer)
- Sending an ACNET message to the States server
  - message contains state's device index and the new state value
  - used by front ends (TLG and instrumentation)

States Server

- Supports state ACNET devices
  - reading/setting
  - basic status/control to enable/disable state assertion
- Controls/transmits state assertion events
  - range checks requested state value
  - rejects requests for disabled states
  - multicast (preferred)
  - setting of registered devices

Anatomy of a State Assertion

- Application (Sequencer) or front end (TLG) sends state update message
  - ACNET device setting or ACNET message
- Server checks if state device is enabled
- Server checks if state value is in range
- Send multicast announcing update
- Sets any registered devices

State Reception (What Do You Get?)

- Device index of ACNET state device
  - 4 byte integer
- State value (0-65535)
  - 2 byte integer
- Timestamp of state assertion
  - 4 byte integer number of seconds since January 1, 1970

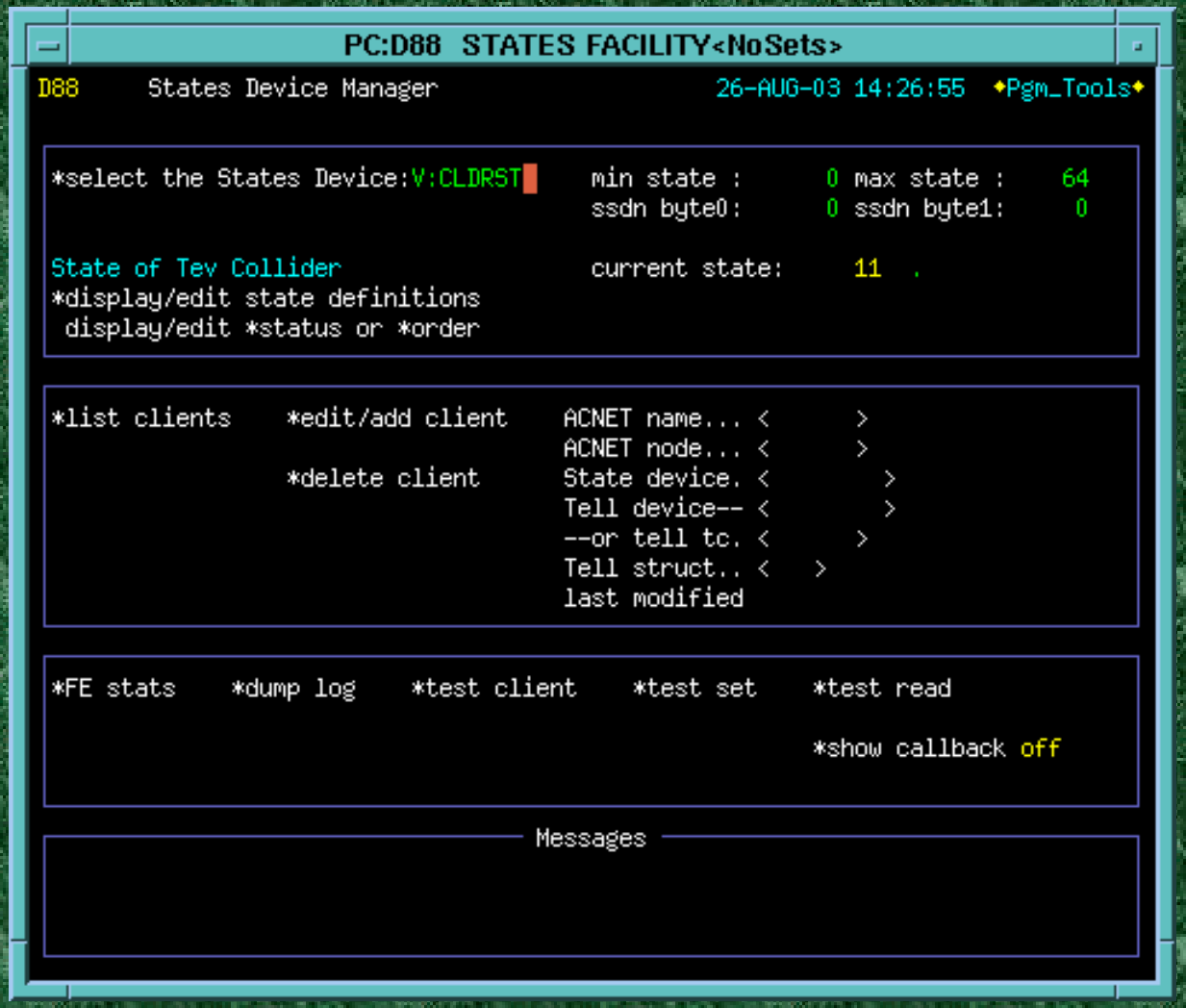
States Misc

- Configuration database
  - contains state descriptive text
  - contains individual state enabled/disabled status
- States utility application (D88)
  - supports editing configuration database
  - configures registered clients
  - displays server statistics

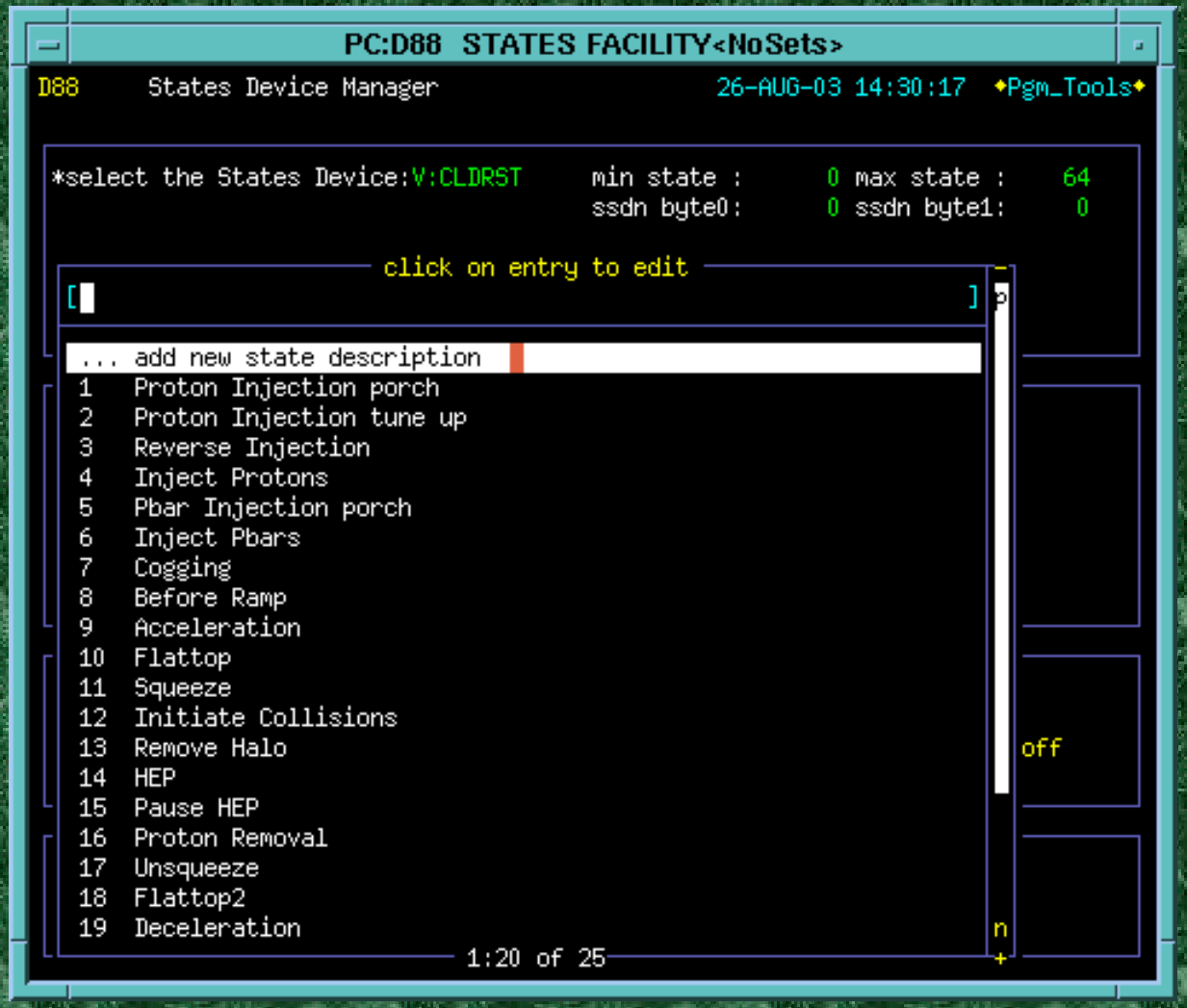
States Misc (continued)

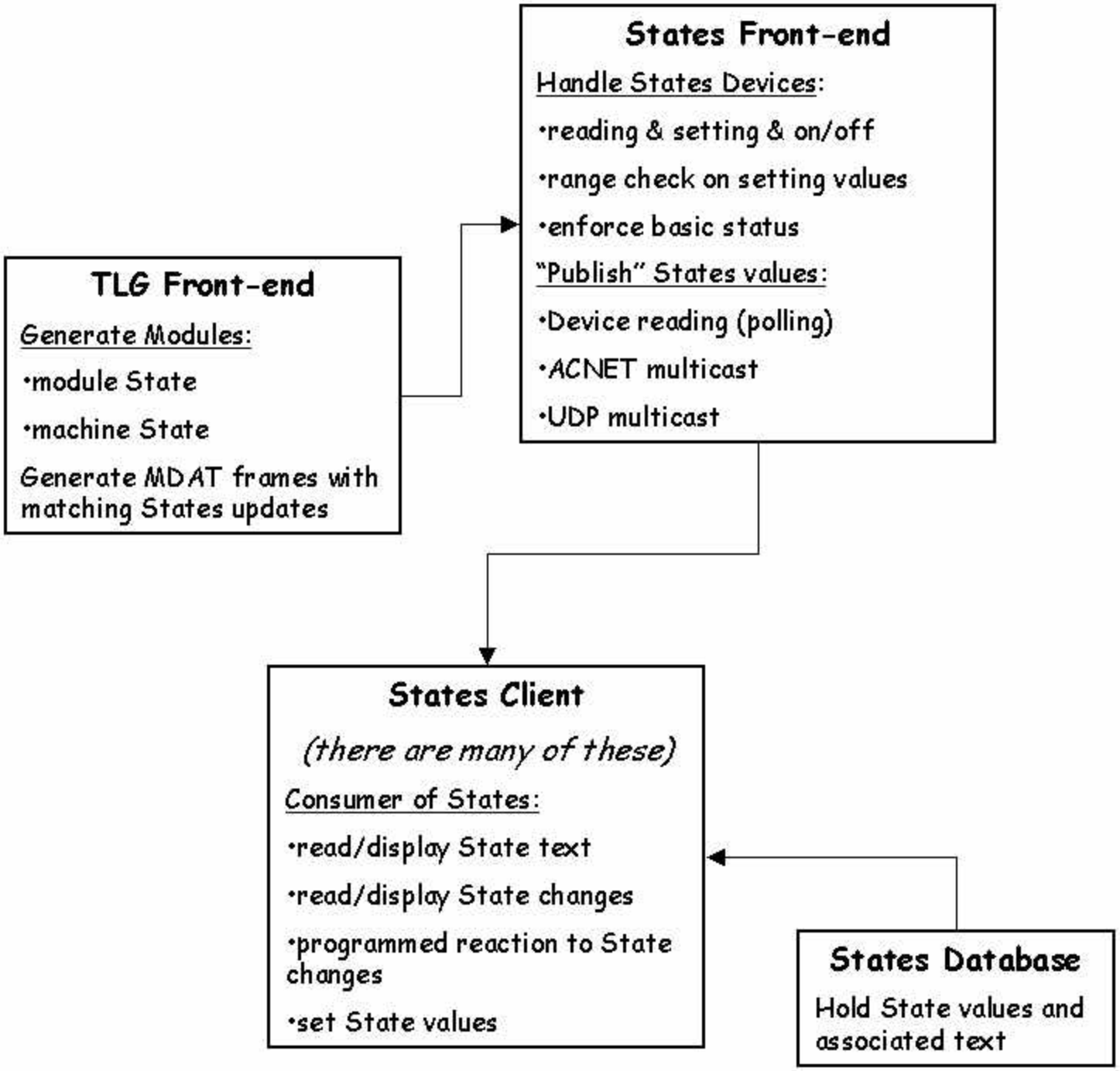
- All state transitions are logged by the “State” data logger
- State device properties
  - reading and setting indicate present state value
  - status and control indicate/control enable status
- Presently there are >200 state devices
- Important Tevatron state devices
  - V:CLDRST, V:TEVMOD, V:TVBEAM, V:COALP

Configuration Application (D88)



Configuration Application (D88)




States Front-end
Handle States Devices:
•reading & setting & on/off
•range check on setting values
•enforce basic status
"Publish" States values:
•Device reading (polling)
•ACNET multicast
•UDP multicast
TLG Front-end
Generate Modules:
•module State
•machine State
Generate MDAT frames with matching States updates
States Client
(there are many of these)
Consumer of States:
•read/display State text
•read/display State changes
•programmed reaction to State changes
•set State values
States Database
Hold State values and associated text

State Uses in the BPM System

- Triggers to arm for data acquisition
- Provide data necessary for making measurements
  - particle types present in the machine
  - coalesced beam status
  - injected beam information