

Notes on an Activity Editor

- 16/7/2013
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Background

This document is based on work done implementing freight-oriented activities and events and subsequent discussions in the forum¹.

It doesn't touch on consists, although they are an important task for the editor - see posts here² and here³, neither does it consider passenger activities in full.

On the Elvas forums, Sniper297 posts an eloquent comparison of facilities in MSTs and Trainz with attention to track occupancy which blocks switches excessively⁴.

Suggestions via forums

Eric Swenson suggests support for serial activities⁵ "Would it be possible to save an activity after it has been run and completed that will have all the rolling stock (including the player, and ai trains, if possible) locations saved as loose consists? This should only require a new .act file be created to show this information.

This would help activity creators make sequential or serial activities without having to have to place any cars that have been moved, picked up, dropped off, etc, in the previous activity."

Matej Pacha suggests we allow equipment to fail⁶ as part of the activity events.

Matej Pacha suggests we allow equipment to run out of fuel and this should trigger an activity event⁷.

¹ <http://www.elvastower.com/forums/index.php?/forum/211-activity-editing/>

² <http://www.elvastower.com/forums/index.php?/topic/15666-consists-for-activities/>

³ <http://www.elvastower.com/forums/index.php?/topic/15636-giving-some-thought-to-ideas-for-a-new-activity-editor/>

⁴ <http://www.elvastower.com/forums/index.php?/topic/15625-experienced-players-and-activities>

⁵ <http://www.elvastower.com/forums/index.php?/topic/17362-saving-activity-after-successful-completion>

⁶ <http://www.elvastower.com/forums/index.php?/topic/16219-brake-pressure-bug-in-v870>

⁷ http://www.elvastower.com/forums/index.php?/topic/15715-new-file-formats-in-json/page_st_60

Jeffrey Kraus-Yao⁸ explains how to add a failed signal to an activity.

Genma Saotome suggests⁹ we control fog and mist from the activity editor.

Performance

Event outcomes can indicate success or failure. Activity creators might benefit from calculating and reporting player performance at the end of the activity (and possibly also during it).

This might be a formula combining lateness, fuel economy, excessive speed, acceleration or braking and missed warnings such as horn soundings.

The key point is that the activity creator can set the weightings for each activity.

Random variations

Event outcomes could have random elements. For instance:

- platform "right away" announcement could be delayed on random occasions by random amounts and for random reasons (in the UK, these delays often have to do with loading supplies for the refreshment car).
- random selection of wagons to drop off or pick up
- exceptional speed restrictions
- signal held at red due to cows on line/damage to overhead wires/points failure

⁸ http://www.elvastower.com/forums/index.php?/topic/16994-failed-signal/page_pid_79933#entry79933

⁹ <http://www.elvastower.com/forums/index.php?/topic/16324-texture-washout>

Events and Outcomes

The bulk of this report is about the limitations of the MSTS event/outcome facilities identified here.

Limited events

Only certain events can be detected. These are

- assemble a train to match a sequence of vehicles, possibly including a loco
- add listed wagons to the player train in any order
- arrive at siding with listed wagons in any order
- arrive at a location
- time since start of activity reached
- speed reached

The most useful event not available is probably "time since another event".

Limited outcomes

Only certain outcomes can be actioned. These are

- pop up a message box,
- terminate the activity as successful or failed
- change the activation of other events.

Too low level

By using activation levels and event numbers, events can be assembled into an activity in quite a flexible way. Possibilities include events in sequence, multiple events not in sequence and events in parallel. However, thanks to the use of numbers and activation levels, it is easy to make mistakes when constructing an activity.

Lacks structure

An activity is composed of multiple elements but these cannot be organised into smaller sub-activity elements.

Testing

MSTS provides an animated map, so the author can watch the player train and AI trains travelling at normal rate or speeded up. This is useful but not very accurate and editing is not supported.

Chris Jakeman's Aims

- 1. To allow activities to do more
- 2. To make it quicker to create an activity
- 3. To make it easier to test and adjust an activity

Doing more

Events

There are many possible events which activities could usefully respond to, such as:

- reduced speed to a given value
- brake or accelerate by more than a given value (e.g. to monitor comfort of passengers or damage to stock)

Interaction with AI trains is useful, so the Location event could take an optional parameter specifying the train.

More versatile versions of existing MSTS events include:

- arrive at a location with an offset along track (e.g. 10m before Milepost 20)
- exceed the speed limit by more than a given amount

For a more extensive list, see the *Appendix - Possible Events In Addition to MSTS*.

Event Filters

In MSTS, the activity creator can apply the filter `TriggerOnStop()`, so the event doesn't fire until the conditions are met and the player's train is stationary. For completeness, we could add:

- `TriggerOnMoving()` with optional parameters "pulling train" and "pushing train".

Outcomes

The MSTS outcomes are the links between tasks, perhaps popping up a message and activating the next event or terminating the activity.

In OR, an outcome should also be able to change the simulation world, so the activity creator can automate some tasks if he wishes. An outcome should be able to issue any command the player can issue.

Dave Nelson suggested a scenario where the player slows his loco to walking pace to allow the brakeman to jump down and change the switch ahead. Before changing the switch, the outcome would switch camera view to that of the brakeman, who would move ahead of the train to the sound of footsteps and after throwing the switch, the outcome restores the original camera view.

For an extensive list of outcomes, see the *Appendix - Possible Outcomes In Addition to MSTs*.

Quick to Create Activity

We are looking here for a minimum of typing and form-filling. One way to achieve this might be the ability to re-use segments of an activity, which we may call sub-activities.

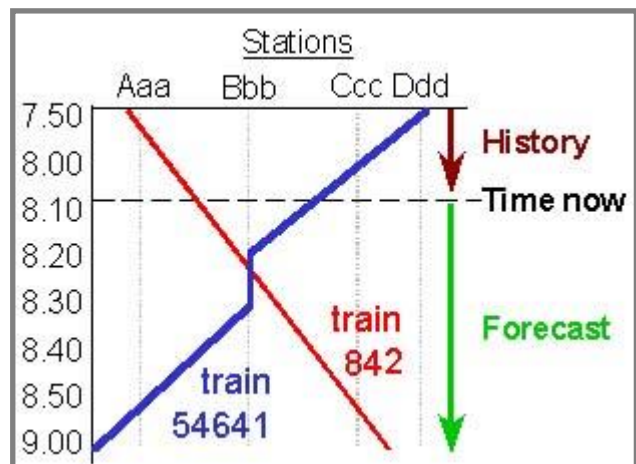
Creating Activities Through Recording

A convenient way to create the skeleton of an activity might be to rehearse the operation by driving the train and recording what happens (as done by the Replay facility). At strategic points in the recording, F2 is pressed to register location and time events for the new activity.

Easy to Test and Adjust Activity

The Activity Editor in MSTs provides an animated map showing the movement of the player train and AI trains.

A conventional rail time-distance diagram could be a more convenient way to view and adjust the schedule of services.



Appendix

1. Possible Events In Addition to MSTs Events¹⁰

- any command issued by the player such as:
 - engage forward direction
 - open/close doors
 - apply brake

also

- add/drop helper loco (implies ability to change to a different loco) pass a trailing switch set against the train
- pass a signal at stop/clear
- exceed the speed limit by more than a given amount
- reduce speed to a given value
- brake or accelerate by more than a given value (e.g. to monitor comfort of passengers or damage to stock)
- test air pressure
- sign train register
- receive train order
- sign train order
- complete breaking down train (spread consist over listed sidings)
- drop off listed wagons at given siding¹¹
- arrive at a location with an offset along track (e.g. 10 metres before Milepost 20)
- arrive at a location too late/early
- water level dangerously low (steam power only)
- fuel exhausted
- block another train causing it to stop/slow

¹⁰ suggested by Dave Nelson

¹¹ as distinct from the MSTs event with this name but a different behaviour.

2. Possible Outcomes In Addition to MSTs Outcomes¹²

- issue any command the player could issue

also

- play sound or voice announcement
- spawn AI train

Comments Loosely Related To Activities

F6 Sprite Text

Dave Nelson posts a plea¹³ for restricting labels for platforms, sidings and wagons to those relevant to the current activity, which could presumably be identified automatically from the activity file.

F7 Sprite Text¹⁴

Dave Nelson suggests that, for consists, that additional information might be available - "Locomotive Number, car initial and number, lading, consignee, tonnage... stuff that will help the player with what he's doing."

Message Fade In and Continuation¹⁵

This thread suggests that the pop-up window might fade in more gracefully, perhaps with a sound (referenced in the ACT file) and that designers could choose whether the simulation was paused or not. (Might benefit from two different styles to emphasise this.)

We should check that a Save and Resume also restores the pop-up if left on screen.

Noisemaker suggested that the designer might specify a duration after which the message faded out again.

¹² suggested by Buttercup and

¹³ <http://www.elvastower.com/forums/index.php?/topic/15636-giving-some-though-to-ideas-for-a-new-activity-editor/>

¹⁴

<http://www.elvastower.com/forums/index.php?app=members&module=messaging§ion=view&do=showConversation&topicID=19261&st=0#msg39194>

¹⁵ http://www.elvastower.com/forums/index.php?/topic/19017-message-fade-in-and-continuation/page_gopid_94555#entry94555

3. Sub-Activities

Objective

- To make it easier to create large activities.
- To make it easier to re-use segments of an activity.
- To support a graphical interface for activity events.

Structure

Sub-activities provide a means to manipulate a network of connected events as a single entity.

Each sub-activity has a name, a single entry and a single exit point. However, any event may terminate the main activity, either with success or failure.

Sub-activities may be nested. Activities and sub-activities may contain a network of connected events, sub-activities or both.

The event, when triggered, may activate one or more other events and each event may be activated by one or more prior events. The status of an event - triggered, not yet triggered, or no longer triggered - may be named and used in a conditional expression to switch the output of an event.

Sub-activities may be generalised through parameters.

The examples here are given in two forms intended to be interchangeable. For convenience, the language is compatible with MSTs STF.

Example 1¹⁶

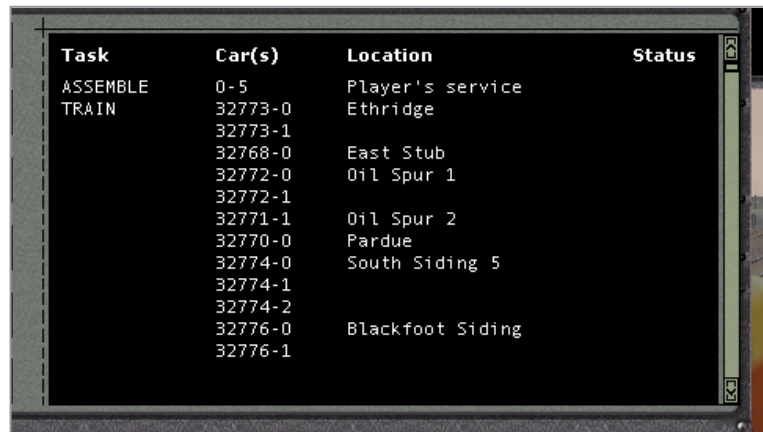
Afternoon Local Duties #3. An activity for Marias Pass. Run a freight train from Shelby to Blackfoot Siding and back. There are pick-ups and drop-offs along the way. Runs about 3 hours. By Jim Meindl.

"Run from Shelby to Blackfoot and back picking up and dropping off cars during your trip."

This activity contains 60 events. I think it is significant that Jim includes a document explaining the sequence of events. This is valuable information which should not require an informal text document. OR should be able to present this data.

¹⁶ <http://www.trainsim.com/kdl.php?fid=18101>

"yard speed limit of 15 mph and the 20 mph limit through crossovers or when taking diverging routes."



Task	Car(s)	Location	Status
ASSEMBLE	0-5	Player's service	
TRAIN	32773-0	Ethridge	
	32773-1		
	32768-0	East Stub	
	32772-0	Oil Spur 1	
	32772-1		
	32771-1	Oil Spur 2	
	32770-0	Pardue	
	32774-0	South Siding 5	
	32774-1		
	32774-2		
	32776-0	Blackfoot Siding	
	32776-1		

[unfinished]