
Graceful Shutdown

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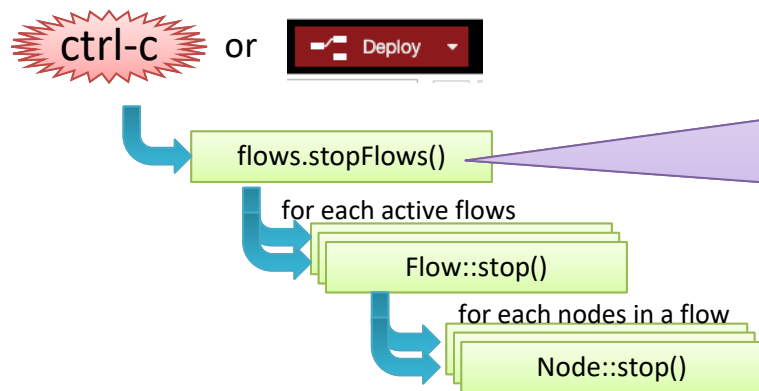
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- There are two approaches to gracefully shutdown flows:
 1. The runtime shutdown the nodes in order, automatically.
 - discussed on last Hursley visit
 2. Flow Developer writes an appropriate shutdown procedure for flow.
 - alternative approach
- In approach 1, it is difficult for runtime to decide which node should be stopped first, I started investigating approach 2.

2. Current Design of Flow Termination Handling

- Flow developer configures which nodes should stop first, and how long the runtime waits before final shutdown process, in a **shutdown** node on each flow.
 - as same as *catch* node
- When the runtime receives SIGINT (or, start a flow deployment), the runtime call 'close' handler of designated nodes, wait for graceful period, and then call 'close' handler of other nodes.



Split this function into three phases:

1. stop only nodes which configured in shutdown node
2. wait *gracefulPeriod* [milliseconds]
3. stop other nodes

3. User Interface

The image shows the Node-RED web interface. On the left, a sidebar contains node categories: 'common' and 'function'. The 'common' category is expanded, showing nodes like inject, debug, complete, catch, status, link in, link out, comment, and shutdown. The 'function' category is also visible below. In the main workspace, a flow named 'Flow 1' is shown. It contains a 'timestamp' node, a 'Delay for interval invocation' node, and a 'some process' node. A 'shutdown' node is highlighted with a red box and a green callout bubble labeled 'shutdown node'. To the right of the workspace, the 'Edit shutdown node' configuration panel is open, also highlighted with a red box and a green callout bubble labeled 'configuration form for shutdown node'. This panel includes a 'Delete' button, 'Cancel' and 'Done' buttons, and a 'Properties' section. The 'Properties' section has a 'Select Nodes' dropdown and a list of nodes with checkboxes: '[get] /test' (checked), 'heavy', 'http', 'delay 10s' (checked), 'msg.payload w', 'timestamp', 'some process', 'Delay for interval invocation' (checked), 'just delays message', and 'other process'. At the bottom of the panel, there are fields for 'Graceful Period' (set to 10000) and 'Name'. On the far right, an 'info' sidebar shows details for the selected 'shutdown' node, including its ID '68defc94.d53724', type 'shutdown', and a description 'Configure shutdown behaviour'.

Node-RED

Flow 1

common

inject

debug

complete

catch

status

link in

link out

comment

shutdown

function

function

switch

change

range

template

Delay for interval invocation

timestamp

some process

shutdown

configuration form for shutdown node

shutdown node

Edit shutdown node

Delete Cancel Done

Properties

Select Nodes

☒ [get] /test http in

☐ heavy function

☐ http http response

☒ delay 10s delay

☐ msg.payload w debug

☐ timestamp inject

☐ some process function

☒ Delay for interval invocation delay

☐ just delays message delay

☐ other process function

Graceful Period: 10000

Name:

info

Information

Node: "68defc94.d53724"

Type: shutdown

Description

Node Help

Configure shutdown behaviour

Dragging a node onto a wire will splice it into the link

- Limitation
 - Deploying flow will be slow because of waiting graceful period.
 - Shutdown logic doesn't detect whether all ongoing processes have been finished.
- Next Steps
 - Write Design note
 - Implement a prototype