

IBM Cloud Pak for Network Automation Use Case Demo

Zero-touch network operations with AI-powered automation



Deliver a 5G vRAN service

Explore the provision of a 5G vRAN network streaming HD video capabilities across mobile devices.

Explore [page 2](#)



Provision a 5G network slice

Learn to provision a 5G network slice to deliver a remote video surveillance service across ATMs.

Explore [page 7](#)



Deploy a 5G network slice

View the deployment of a 5G network slice to monitor ATMs with a surveillance camera across different locations.

Explore [page 13](#)

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How can I deliver a 5G vRAN service?

Carol works as a Network Engineer as part of a fictional 5G company. She received an urgent request to provision a new 5G vRAN (virtual radio access network) to stream HD videos across mobile devices. Carol sees mobile service requests increasing. She feels challenged to deliver them as quickly as possible.

Carol creates a 5G vRAN to deliver this remote video streaming service that requires high bandwidth. Carol knows that **IBM Cloud Pak for Network Automation** can deliver a one touch deployment capability supported by zero-touch automation for the creation of the new vRAN network and service.



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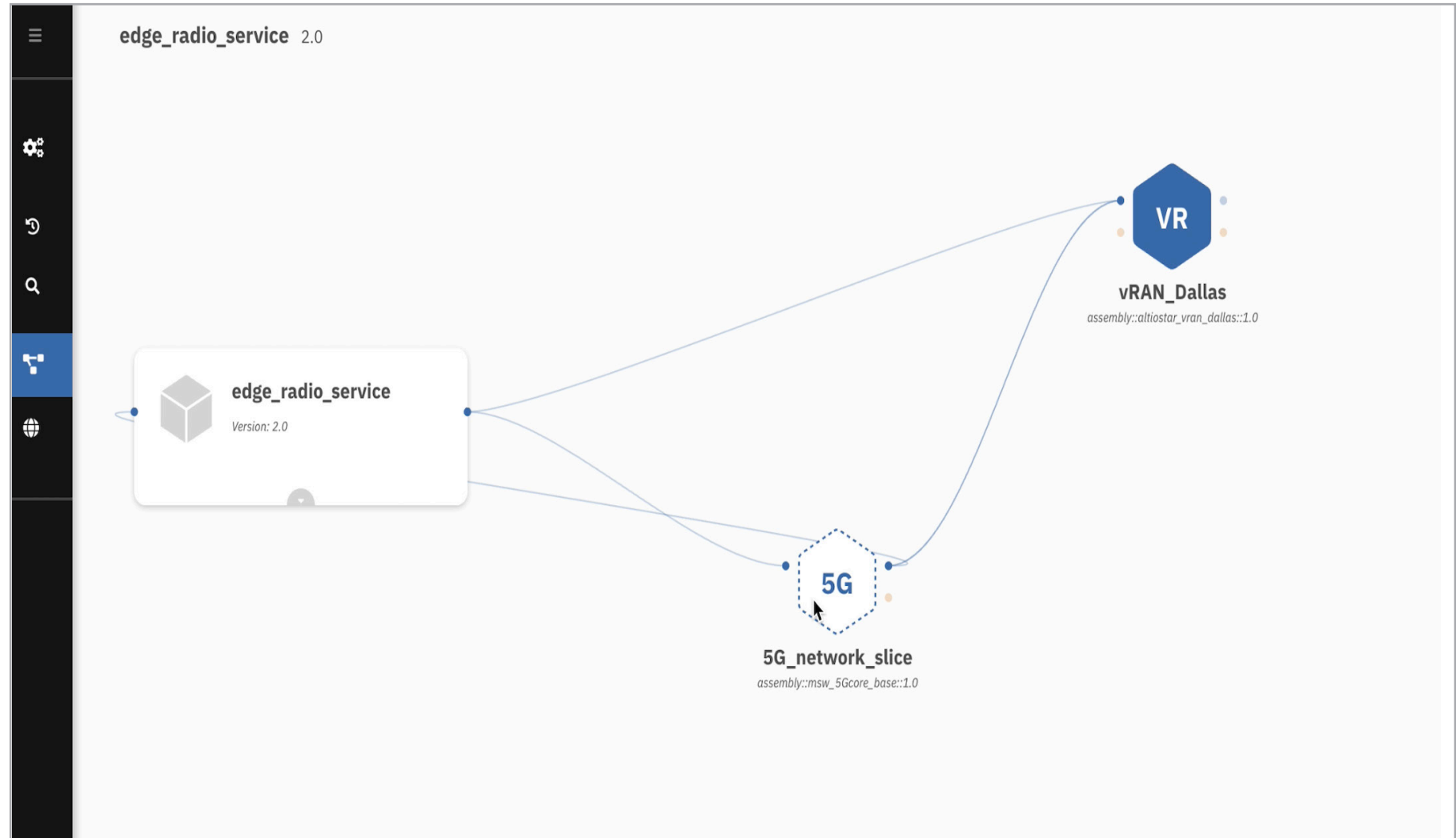
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How to deliver a 5G service

Designing the 5G vRAN service

Carol takes the request and provides the software functions and configuration settings for the network and the service.

Carol creates the design quickly. She selects the dependencies between the software functions and any external requirements. Carol stores the design in the catalogue.



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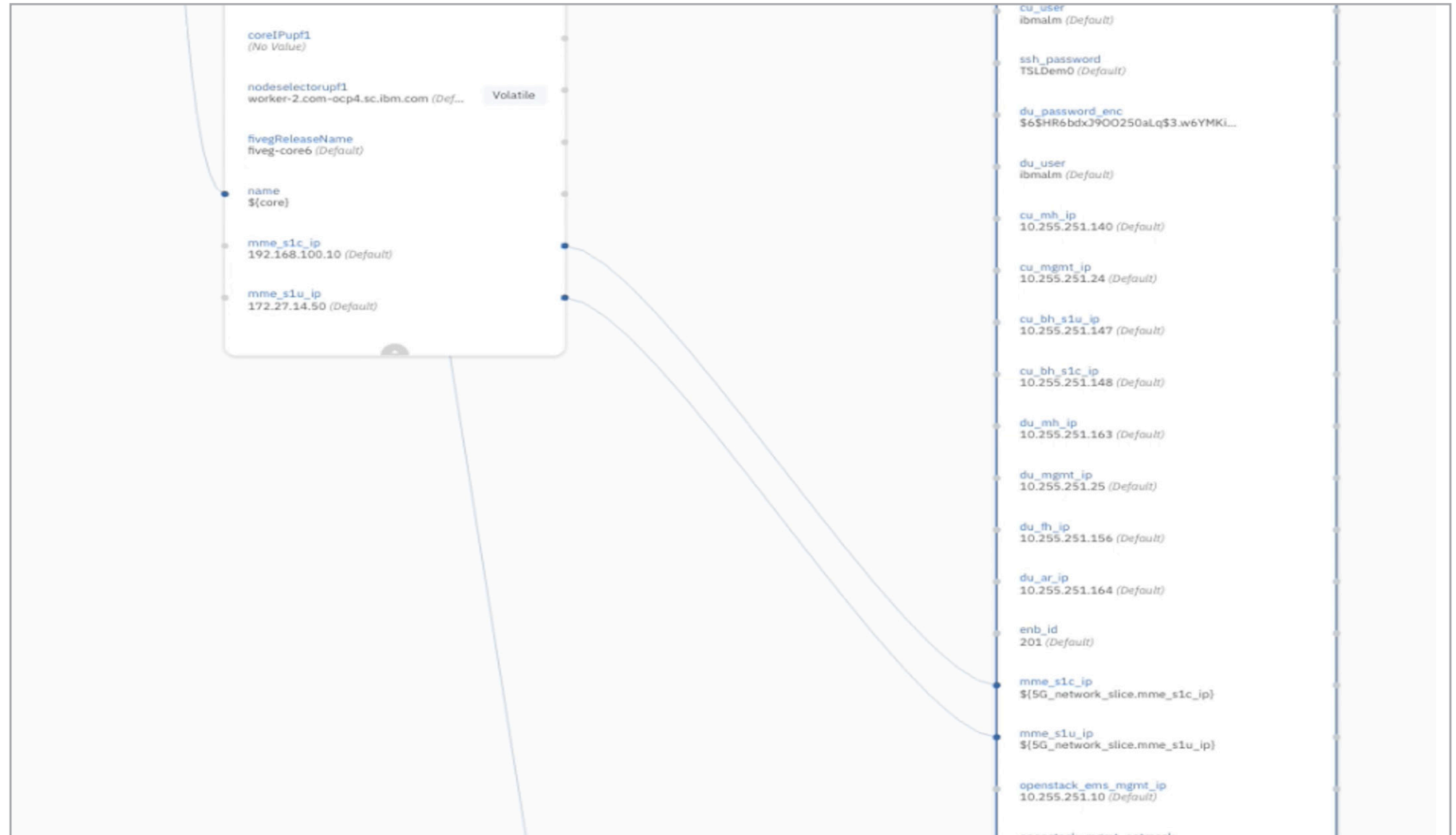
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Building the 5G vRAN network and service

Craig the Network Service Engineer builds the vRAN network and service. Craig combines catalogue items to deliver the network, such as the 5G vRAN network and the connection to the EPC core.

He builds the 5G network slice.
He can deploy this service that he builds across other customer sites also.



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Deploying the 5G vRAN network

Craig runs a compiled assembly to automatically deploy the 5G vRAN network. The assembly might contain a few cell sites for a network upgrade that he can extend to more sites.

By clicking Create, he deploys the network across ten sites in Dallas. Each site is tested before it carries traffic.

The screenshot shows the IBM Cloud Pak for Network Automation interface. On the left is a dark sidebar with the IBM logo and navigation options: Operations, Recent Assembly Instances (highlighted), Assembly Instance Search, Assembly Designer, and System. At the bottom of the sidebar are user options for 'aladmin' and 'Sign Out'. The main area is titled 'Recent Assembly Instances' and features a 'Create' button in the top right. Below the title is a table with columns: Name, State, Descriptor, Last Intent, Status, Start Time, and actions (New Intent, Open, and a menu icon). The table contains ten rows of assembly instances.

Name	State	Descriptor	Last Intent	Status	Start Time	
radio_dallas	Unknown	edge_radio_service 2.0	Create		1:41:19 PM 11/11/20	New Intent Open ...
5G_core_base	Active	msw_5Gcore_base 1.0	Create		7:39:14 AM 11/11/20	New Intent Open ...
jnpr_lsp	Active	jnpr_lsp1 1.0	Upgrade		4:13:45 PM 11/03/20	New Intent Open ...
jnpr_infra	Active	jnpr_infra 1.0	Create		4:12:34 PM 11/03/20	New Intent Open ...
msw-sbc	Installed	msw_sbc 1.0	Create		2:56:45 PM 10/23/20	New Intent Open ...
msw-cc	Active	msw_cc 1.0	Change State		2:41:15 PM 10/23/20	New Intent Open ...
msw-support	Active	msw_support_no_nets 1.0	Change State		2:33:51 PM 10/23/20	New Intent Open ...
kaloom_test	Installed	kaloom_upf_assembly 1.0	Create		1:29:34 PM 10/16/20	New Intent Open ...
test_jeam	Active	edge_management 1.0	Upgrade		4:45:31 PM 10/14/20	New Intent Open ...

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Deploying the 5G vRAN service

When the 5G vRAN network is available, Craig deploys the service the same way. He selects the correct assembly and then clicks Create.

Craig tracks the deployment progress in the GUI in real-time for the service components. When the components are green, the service is available to the customer.

The screenshot displays the IBM Cloud Pak for Network Automation interface. At the top, the service 'radio_dallas' is shown as 'Active'. The 'Intent' is 'CreateAssembly', which started at 1:41:19 PM on 11/11/20 and completed in 00:01:20. The status is 'Completed'. A 'Dependencies' toggle is turned off, and there are buttons for 'Execution History' and 'New Intent'. Below this, a table lists the components of the service:

Component	CREATE	CONFIGURE
radio_dallas	Progress bar (green)	Progress bar (green)
radio_dallas_vRAN_Dallas	Progress bar (green)	Progress bar (green)
...dallas_vRAN_Dallas_cu	Progress bar (green)	Progress bar (green)
...allas_vRAN_Dallas_du	Progress bar (green)	Progress bar (green)
5G_network_slice	Progress bar (green)	Progress bar (green)

The left sidebar contains navigation options: Operations, Recent Assembly Instances, Assembly Instance Search, Assembly Designer, and System. The user 'aladmin' is logged in, and there is a 'Sign Out' button. At the bottom, there are tabs for 'Topology' and 'Execution', and the IBM logo is visible in the bottom right corner.

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How to deliver a 5G service

Zero-touch Operations

During the service design and deployment stage, Carol and Craig define self-heal capabilities to ensure that autonomous fixes are in place to solve issues.

For example, if the maximum speed is not available for the video service, then an automated fix occurs to increase the service bandwidth.

The screenshot shows the 'EVENT VIEWER' interface with a navigation menu at the top (Administration, Incident, Insights, Samples, Troubleshooting and Support) and a toolbar with various icons. A summary bar indicates 207 critical alerts, 46 warnings, 91 info, 3277 info, 274 info, and 1341 success. The main table lists the following alerts:

Sev	Ack	Node	Alert Group	Summary	First Occurrence	Last Occurrence	Count	Type	ExpireTime	Agent
Critical	No	noi-ncoprimary-0	TopClasses	ALERT: last 5 mins: high number of events for class: ASM (45111): 4338	11/3/20, 5:29 AM	11/11/20, 7:39 PM	2,474	Problem	86,430	OMNIBus Self
Critical	No	noi-ncoprimary-0	ProbeStatus	ALERT: message_bus Probe (Conn ID: 2): sent high number of events: 4338	11/5/20, 10:39 PM	11/11/20, 7:39 PM	1,693	Problem	86,430	OMNIBus Self
Critical	No	radio_dallas__vRAN_Dallas_	ALTIOSTAR_VCU_ISSUE	vCU failed Restart is required	11/11/20, 7:02 PM	11/11/20, 7:02 PM	1	Problem	Not Set	Prometheus Al
Critical	No	radio_dallas__vRAN_Dallas_	ALTIOSTAR_VCU_ISSUE	vCU failed Restart is required	11/11/20, 6:30 PM	11/11/20, 6:30 PM	1	Problem	Not Set	Prometheus Al
Critical	No	radio_dallas__vRAN_Dallas_	ALTIOSTAR_VCU_ISSUE	vCU failed Restart is required	11/11/20, 5:41 PM	11/11/20, 5:41 PM	1	Problem	Not Set	Prometheus Al
Critical	No	radio_dallas__vRAN_Dallas_	ALTIOSTAR_VCU_ISSUE	vCU failed Restart is required	11/11/20, 5:20 PM	11/11/20, 5:20 PM	1	Problem	Not Set	Prometheus Al
Critical	No	radio_dallas__vRAN_Dallas_	ALTIOSTAR_VCU_ISSUE	vCU failed Restart is required	11/11/20, 5:04 PM	11/11/20, 5:04 PM	1	Problem	Not Set	Prometheus Al
Critical	No	vRAN_Dallas__cu	ALTIOSTAR_VCU_ISSUE	vCU failed Restart is required	11/11/20, 1:24 PM	11/11/20, 1:24 PM	1	Problem	Not Set	Prometheus Al
Critical	No	radio_dallas__vRAN_Dallas_	ALTIOSTAR_VCU_ISSUE	vCU failed Restart is required	11/11/20, 1:12 PM	11/11/20, 1:12 PM	1	Problem	Not Set	Prometheus Al
Critical	No	udr	ASM Status	udr is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	troubleshooter	ASM Status	troubleshooter is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	postgres	ASM Status	postgres is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	troubleshooter	ASM Status	troubleshooter is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	h2-sas-proxy	ASM Status	h2-sas-proxy is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	mme	ASM Status	mme is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	troubleshooter	ASM Status	troubleshooter is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	h2-sas-proxy	ASM Status	h2-sas-proxy is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	sas-web	ASM Status	sas-web is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	pymmetester	ASM Status	pymmetester is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.
Critical	No	ausf	ASM Status	ausf is terminated, Reason: Error	11/11/20, 12:48 PM	11/11/20, 12:47 PM	1	Problem	Not Set	KUBERNETES.

Total: 207 Selected: 1

1:42 PM : 53 row(s) inserted and 169 row(s) modified. Refresh in: 39

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How to design a new service

How can I provision a new 5G network slice?

Lucy is a Network Engineer at a fictional 5G service provider. A financial services customer requested a remote video surveillance service to monitor their automated teller machines (ATM). The customer has security concerns and wants to monitor the ATM usage remotely.

Previously, the provisioning of a new 5G network slice with a shared service was a tedious task, using several tools and interfaces. Thanks to **IBM Cloud Pak for Network Automation**, she uses templates to create a new service quickly.

The IBM ecosystem provides ready- certified VNFs, saving Lucy days in getting them to market.



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Composing a service template

Lucy opens the service catalog. Lucy uses an assembly template to provision the core network slice with shared services for video surveillance across the ATMs.

Lucy finds the Network Subnet Slice (nsst_shared) template and checks if the parameter propagation in the template is suitable to use.

The screenshot displays the 'nsst_shared 1.0' service composition interface. On the left, a card for 'nsst_shared Version: 1.0' is connected to a list of parameters on the right. The parameters are: 'service ncshared (Default)', 'mgmt_net_cidr \${mgmt_net_cidr}', 'sbi_net_cidr \${sbi_net_cidr}', 'n2n1_net_cidr \${n2n1_net_cidr}', 'n3_net_cidr \${n3_net_cidr}', 'n4_net_cidr \${n4_net_cidr}', and 'n6_dnn_net_cidr \${n6_dnn_net_cidr}'. A blue hexagonal icon labeled 'Ns' is positioned above the parameter list. On the right, a 'Properties' panel for 'ns_shared assembly::ns_shared::1.0' shows the following configuration:

- service: ncshared
- mgmt_net_cidr: \${mgmt_net_cidr} (management network IP range)
- sbi_net_cidr: \${sbi_net_cidr} (SBI network IP range)
- n2n1_net_cidr: \${n2n1_net_cidr} (N2N1 network IP range)

The interface includes a sidebar with navigation icons, a top bar with '+ Add Element' and 'Save' buttons, and a bottom bar with 'Composition' and 'Behaviour Testing' tabs. The IBM logo is visible in the bottom right corner.

Learn more

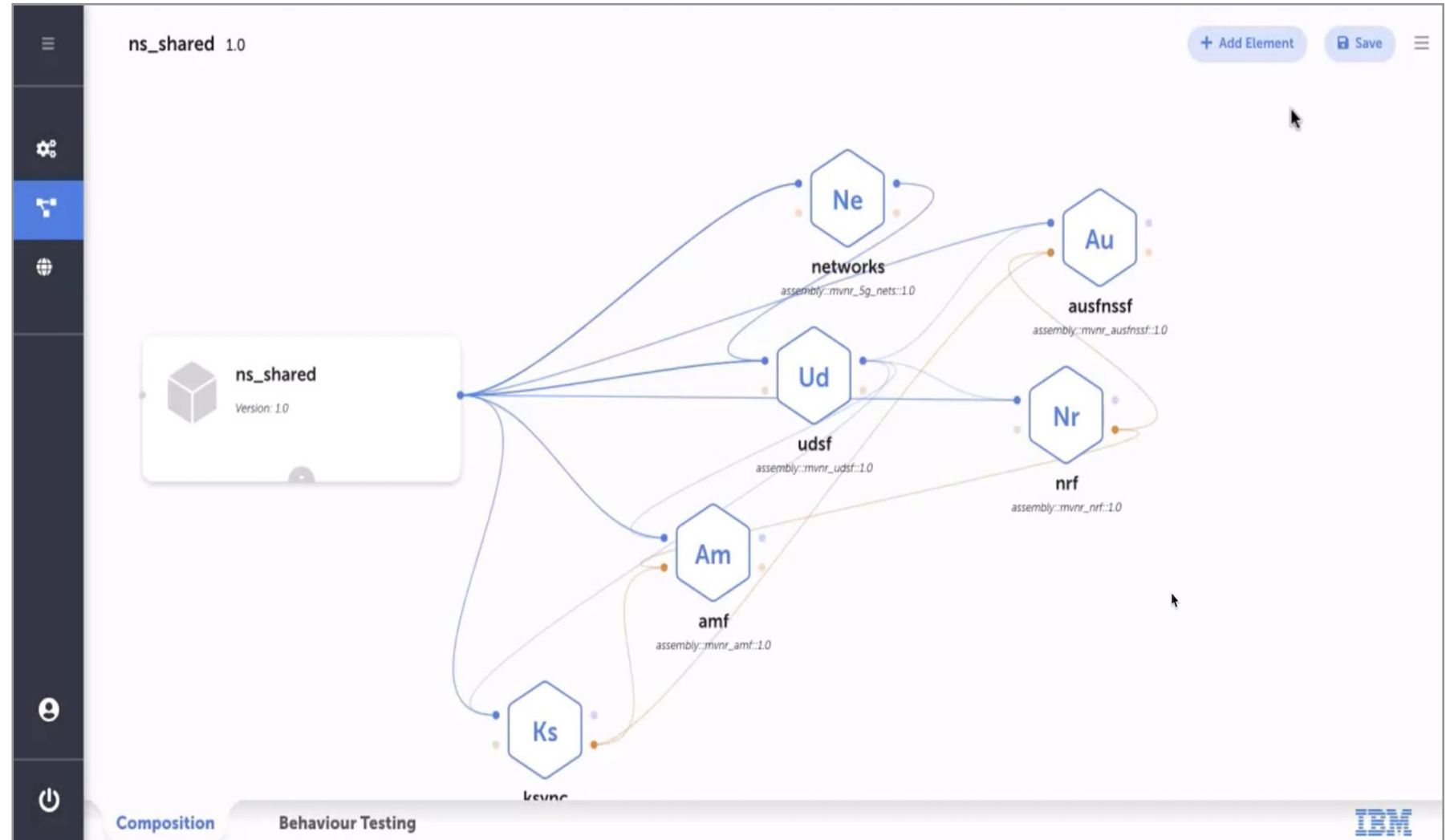
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Verifying the service design

Lucy explores the service design to ensure that she has the right template. Lucy verifies that the correct parameters are propagated to the nested components.

She looks at the component dependencies, shown on the diagram with the orange lines. Lucy is now confident that the service design is correct.



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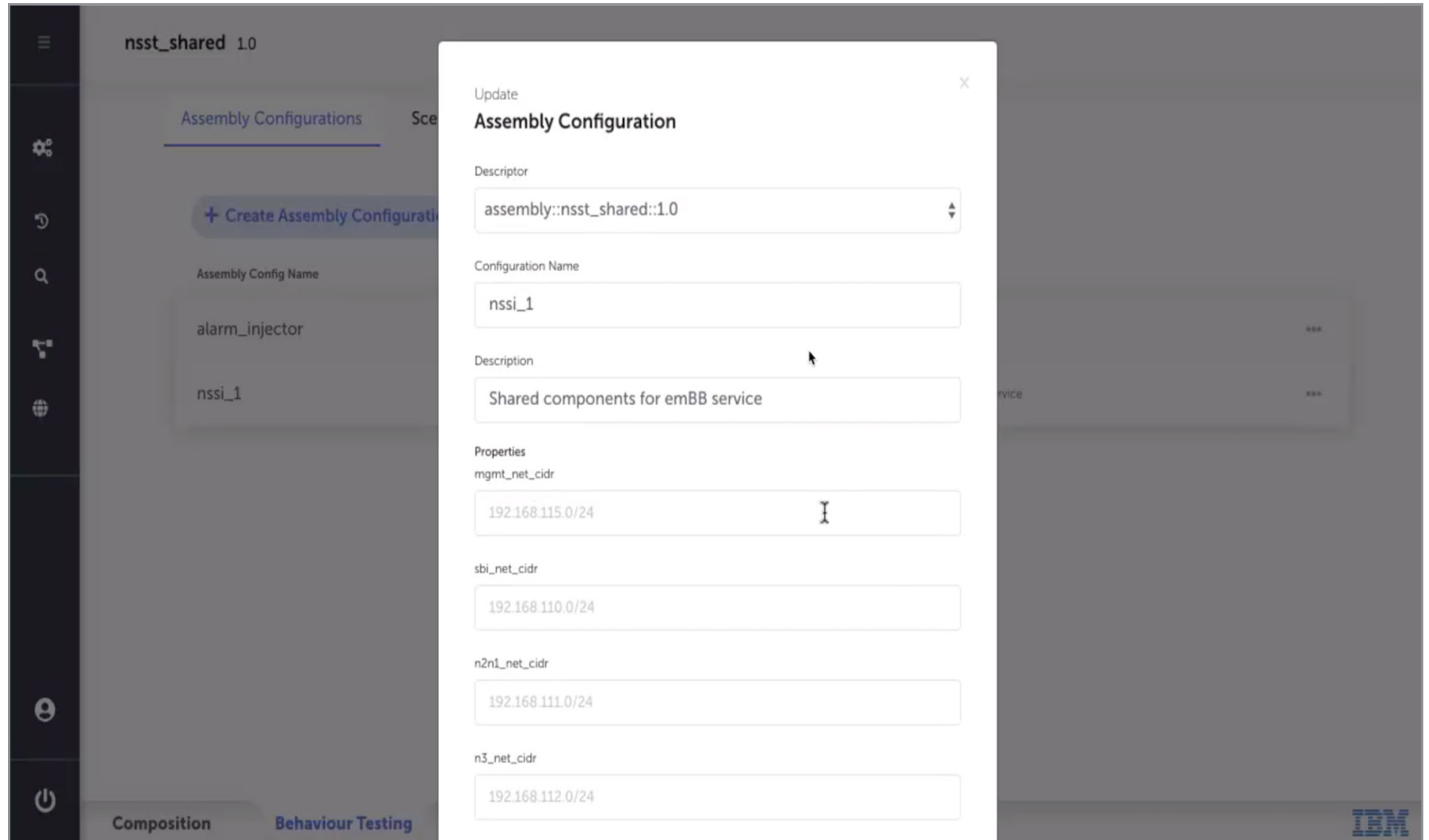
How to design a new service

Reviewing the assembly configuration

Lucy opens the Behavior testing tab to start testing and provisioning the new 5G network slice.

Lucy looks at the template instance to verify that the assembly configuration values are correct for the instance of the service.

She is satisfied with the existing default values.



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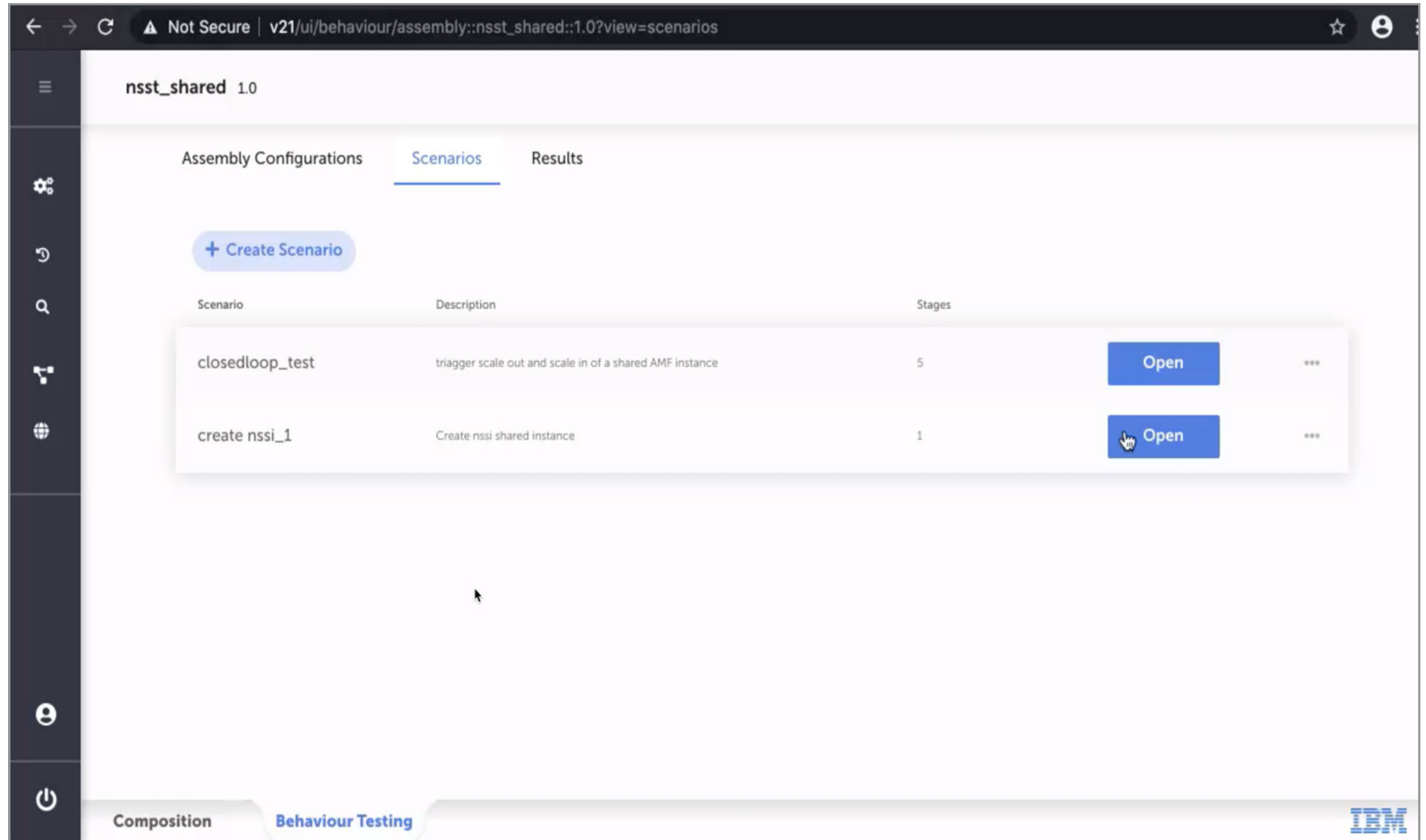
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Selecting scenarios

Scenarios represent the provisioning sequences that enable actions on the template. Lucy can work with an existing or a new scenario.

Mostly, the standard scenario works for the new customer 5G network slice. Lucy opens the “create a new instance” (create_nssi_1) scenario.



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Running the scenario

Lucy runs the scenario with just one click. The scenario uses behavior-driven expression syntax. The elements and steps to create the nssi slice and shared services are detailed in a human-readable natural language.

Lucy stores the design in the catalog for Colin the Network Service Engineer to use.

The screenshot displays the configuration interface for a scenario named 'nsst_shared 1.0'. The main area is titled 'create nssi_1' and includes a 'Save' button and a 'Run Scenario' button. Under the 'Assemblies' section, the configuration is as follows:

- Create an Assembly called based on the nssi_1 configuration
- Starting in the state
- After the Scenario completes the Assembly

The 'Stages' section shows a 'Default Stage' with a dashed box containing the text 'Drag Steps here to add to the Stage'. On the right side, there is a 'Scenario Palette' with the following items:

- Assembly Configurations
- Assembly Events
- Intent Engine
- Intent Requests
- Metric Assertions
- Metric Definitions
- Metric Recording
- Utilities

At the bottom, there are tabs for 'Composition' and 'Behaviour Testing', with 'Behaviour Testing' currently selected. The IBM logo is visible in the bottom right corner.

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How to deploy a new service

Deploying the 5G network slice

Lucy the Network Engineer completes the design, provision of the 5G network slice and service and stores it in the catalog. Now, Colin the Network Service Engineer runs the specific scenario to deploy the 5G network slice and service.

The orchestrator function of **IBM Cloud Pak for Network Automation** kicks in, starting the provisioning process.

Colin can track the progress on the Behavior Testing tab or switch to view the details in the Orchestrator view.



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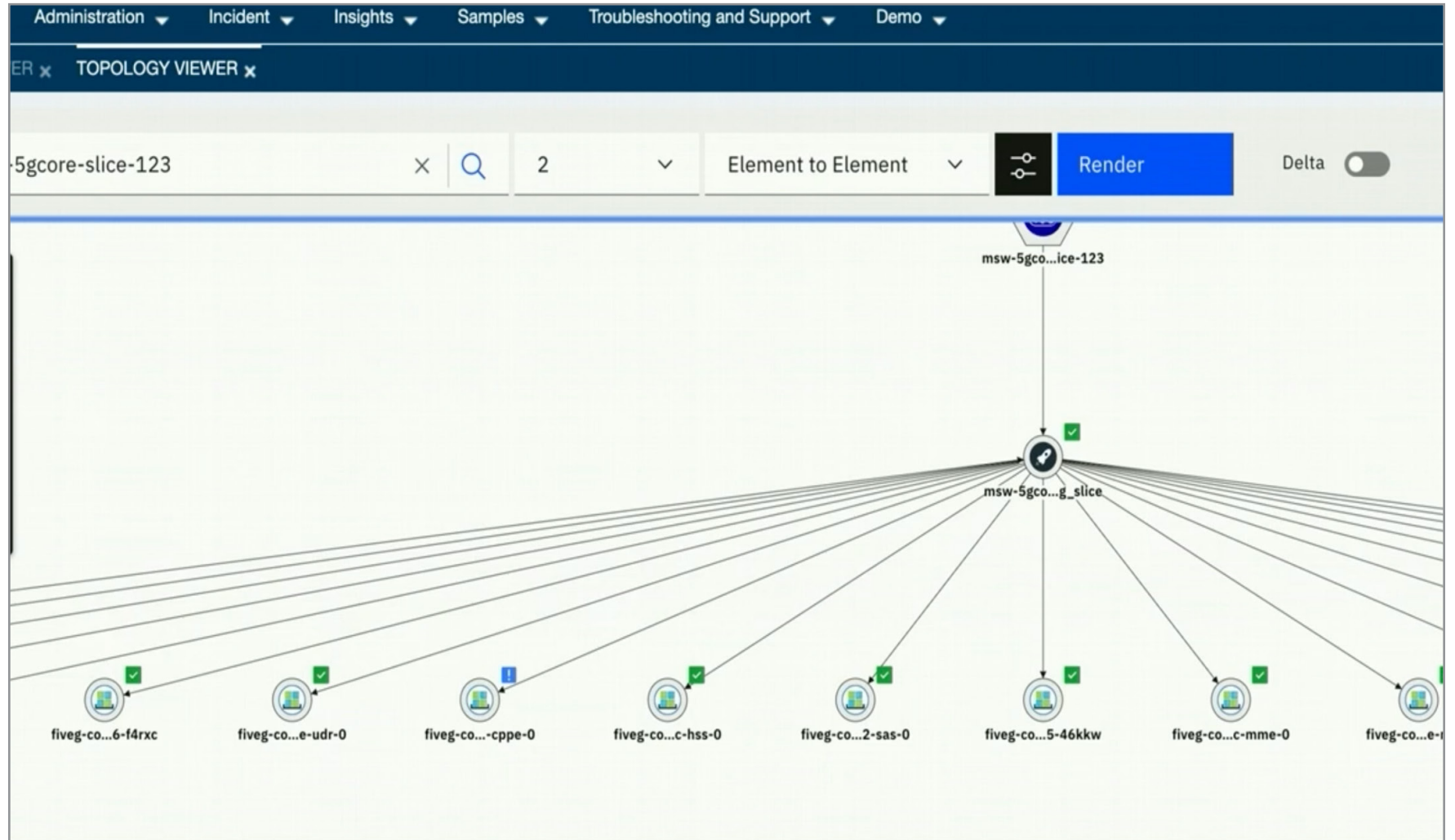
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Opening the topology viewer

Colin opens the dynamic topology viewer.
Colin selects the network slice instance and looks at the service topology.

As indicated by the green box containing the check, not all components have initialized fully yet. A refresh of the screen shows that the last network element is available.



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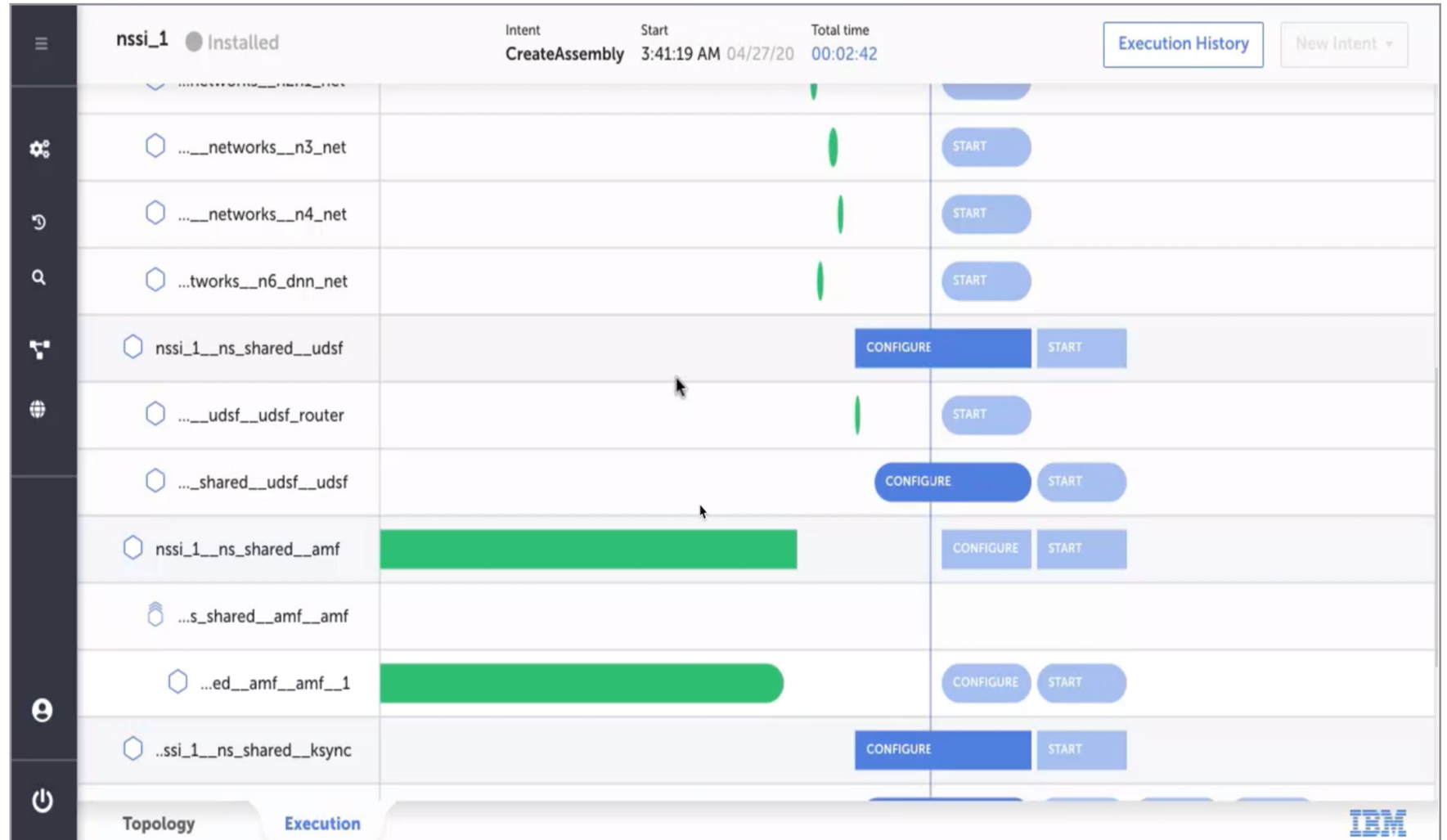
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Monitoring the provisioning process

Colin uses the Gantt chart to view the sequence, dependencies, and current status of all tasks. After a few minutes, provisioning is complete.

Colin can use the color-coding capability of the Execution view to identify tasks that complete successfully and any issues that occur.



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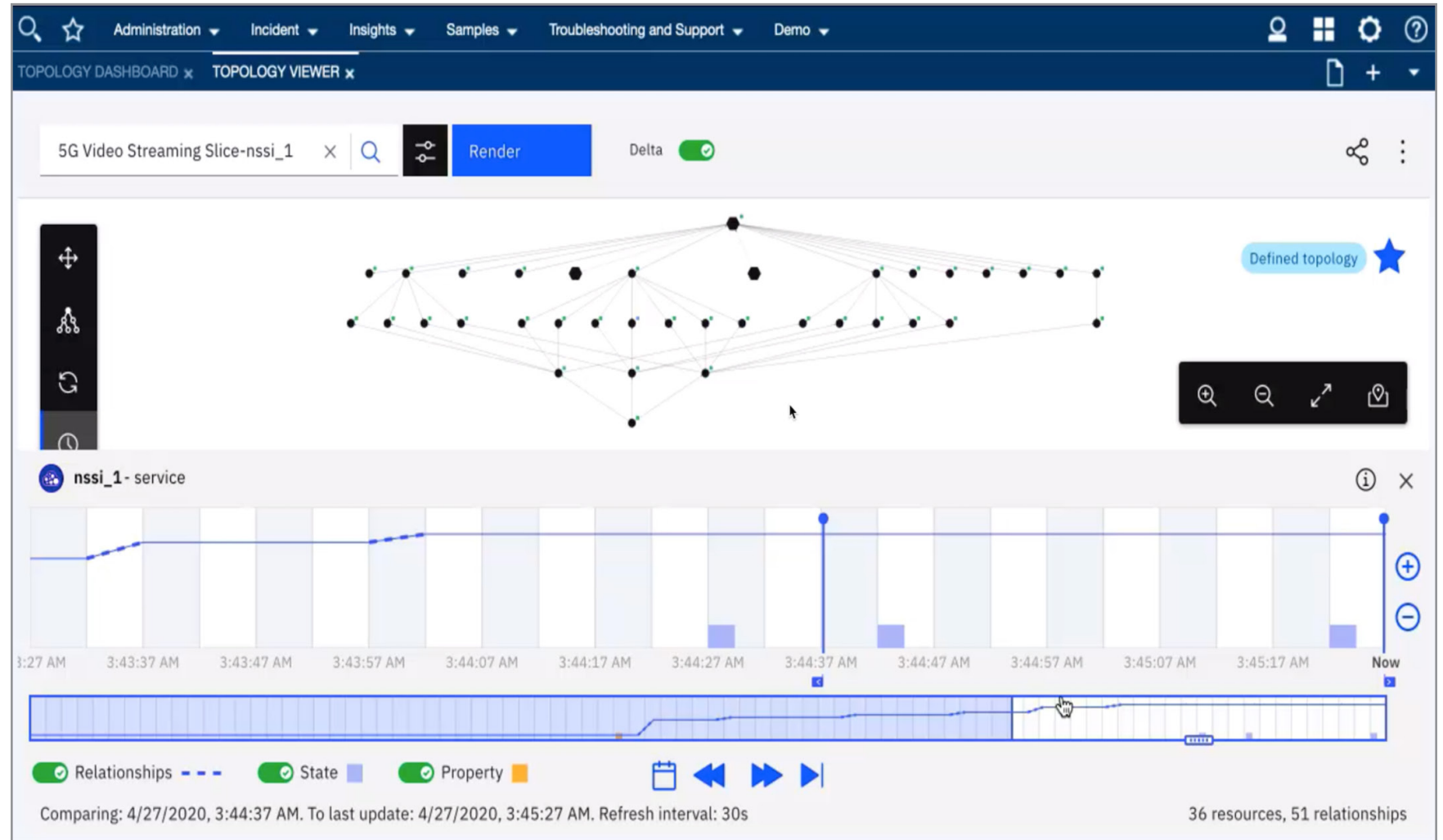
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Viewing the topology changes

In the timeline view, Colin sees how the topology changes over time. This ensures that the provisioning process is working as expected, as well as assist in diagnosing any issues.

The view can be filtered and zoomed in or out, so that complex topologies can be visualized over time.



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Completing the task

Changes in the 5G network slice are synchronized back to the network topology database.

Colin can now look at the history for all deployments of the same service to check when and how well the deployments completed.

Jenkins Pipeline `cisd_5gcore_slice`

Pipeline to create 5G Core slice

Recent Changes

Stage View

Average stage times: (Average full run time: ~2min 16s)

Build #	Time	Checkout SCM	onboard service	Create Test Service	Successive: Post Actions
#40	Apr 28, 2020 6:53 PM	227ms	5s	2min 2s	49ms
#39	Apr 28, 2020 6:51 PM	168ms	6s	10s	51ms
#38	Apr 28, 2020 6:43 PM	168ms	2s	35ms	60ms
#37	Apr 28, 2020 6:39 PM	235ms	3s	37ms	59ms

Build History

- #40 Apr 28, 2020 6:53 PM
- #39 Apr 28, 2020 6:51 PM
- #38 Apr 28, 2020 6:43 PM
- #37 Apr 28, 2020 6:39 PM
- #36 Apr 13, 2020 6:19 PM
- #35 Apr 13, 2020 1:13 PM
- #34 Apr 13, 2020 1:10 PM
- #33 Apr 13, 2020 1:05 PM
- #32 Apr 13, 2020 1:02 PM
- #31 Apr 7, 2020 5:24 PM

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Zero-touch network operations with AI-powered automation

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IBM Cloud Pak for Network Automation



Get an offering summary

Learn about our AI-powered, telco cloud platform that enables the automation of networks.

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View the Infographic

See how CSPs achieve zero-touch network automation as they rapidly deploy ad scale new services.

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Analyse the CSP transformation

CSPs must embrace automation to deliver services that drive growth and improve customer experiences.

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