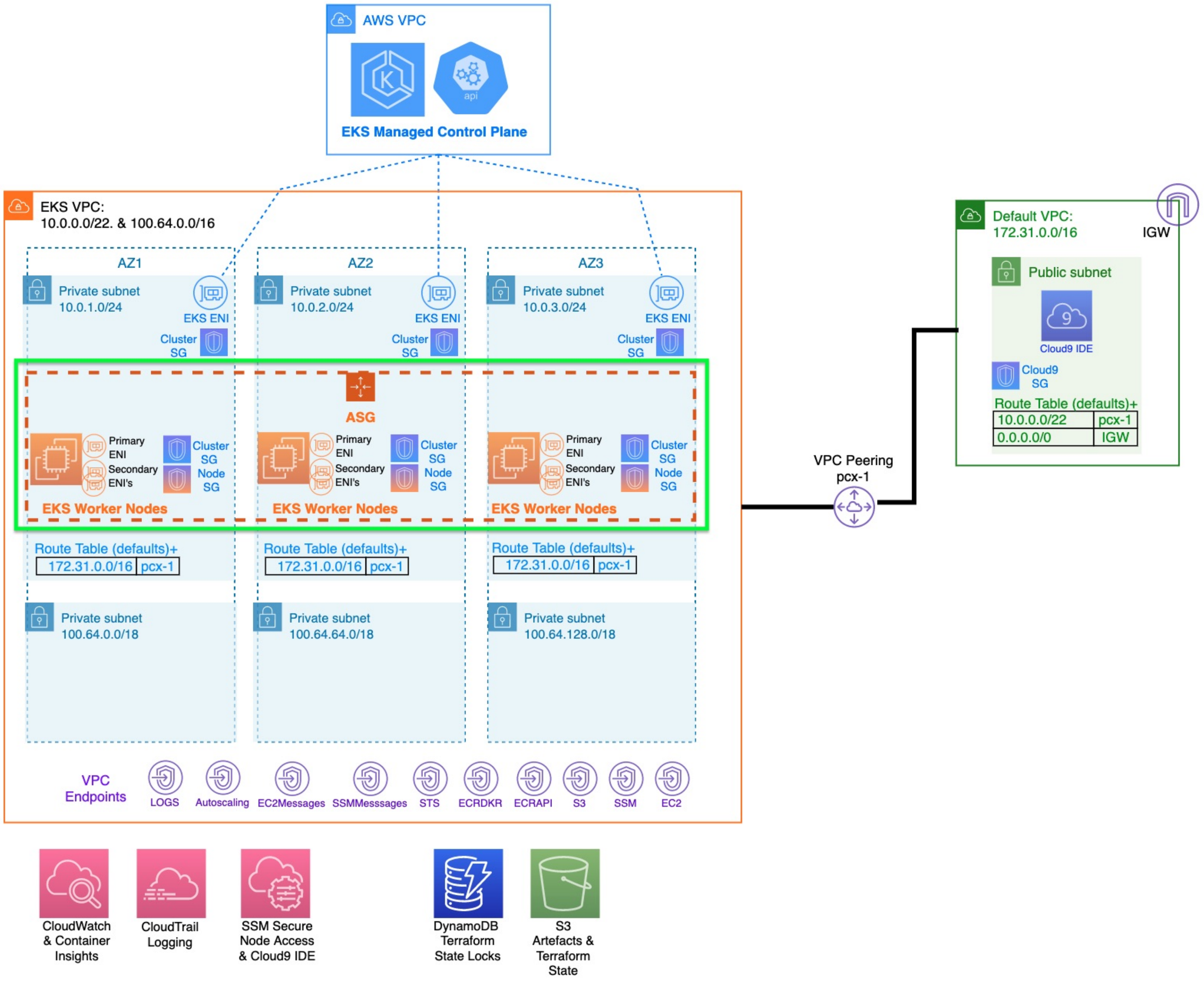
Creating the EKS NodeGroup

Create a managed node group with a custom ami and user_data



```
cd ~/environment/tfekscode/nodeg
```

Initialize Terraform:

```
terraform init
```

Validate the Terraform code:

```
terraform validate
```

Plan the deployment:

```
terraform plan -out tfplan
```

** THE OUTPUT IS TRUNCATED FOR BREVITY INDICATED WITH '....' **

```
data.aws_ssm_parameter.ca: Reading...

....

data.aws_subnet.i2: Read complete after 0s
data.aws_caller_identity.current: Read complete after 0s [id=440018911661]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the fol
  + create

Terraform will perform the following actions:

  # aws_eks_node_group.ng1 will be created
  + resource "aws_eks_node_group" "ng1" {
      + ami_type               = (known after apply)
      + arn                    = (known after apply)
      + capacity_type          = (known after apply)
      + cluster_name           = "mycluster1"
      + disk_size              = 0
      + id                     = (known after apply)
      + instance_types         = []
      + labels                 = {
          + "eks/cluster-name"   = "mycluster1"
          + "eks/nodegroup-name" = "ng1-mycluster1"
        }
      + node_group_name        = "ng1-mycluster1"
      + node_group_name_prefix = (known after apply)
      + node_role_arn          = (sensitive value)
      + release_version        = (known after apply)
      + resources              = (known after apply)
      + status                 = (known after apply)
      + subnet_ids             = (sensitive value)
      + tags                   = {
          + "eks/cluster-name"                           = "mycluster1"
          + "eks/nodegroup-name"                         = "ng1-mycluster1"
          + "eks/nodegroup-type"                          = "managed"
          + "eksctl.cluster.k8s.io/v1alpha1/cluster-name" = "mycluster1"
        }
      + tags_all              = {
          + "eks/cluster-name"                            = "mycluster1"
          + "eks/nodegroup-name"                          = "ng1-mycluster1"
          + "eks/nodegroup-type"                          = "managed"
          + "eksctl.cluster.k8s.io/v1alpha1/cluster-name" = "mycluster1"
        }
      + version               = (known after apply)

      + launch_template {
          + id      = (known after apply)
          + name    = "at-lt-mycluster1-ng1"
          + version = "1"
        }

      + scaling_config {
          + desired_size = 2
          + max_size     = 3
          + min_size     = 1
        }

      + timeouts {}
    }


....

  # null_resource.annotate will be created
  + resource "null_resource" "annotate" {
      + id       = (known after apply)
      + triggers = {}
    }

  # null_resource.gen_cluster_auth will be created
  + resource "null_resource" "gen_cluster_auth" {
      + id       = (known after apply)
      + triggers = {}
    }

Plan: 4 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + config-map-aws-auth = "local.config-map-aws-auth"
  + kubeconfig          = "local.kubeconfig"

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Saved the plan to: tfplan
```

```
To perform exactly these actions, run the following command to apply:
    terraform apply "tfplan"
```

You can see from the plan the following resources will be created

- A Launch template
- A NodeGroup using the launch template above
- A null resource (this will auth us to the cluster)

Build the environment:

```
terraform apply tfplan
```

** THE OUTPUT IS TRUNCATED FOR BREVITY INDICATED WITH '....' **

```
aws_launch_template.lt-ng1: Creating...
aws_launch_template.lt-ng1: Creation complete after 0s [id=lt-0bc35815d22910c0d]
aws_eks_node_group.ng1: Creating...
aws_eks_node_group.ng1: Still creating... [10s elapsed]
....
aws_eks_node_group.ng1: Still creating... [1m50s elapsed]
aws_eks_node_group.ng1: Creation complete after 2m0s [id=mycluster1:ng1-mycluster1]
null_resource.annotate: Creating...
null_resource.gen_cluster_auth: Creating...
null_resource.gen_cluster_auth: Provisioning with 'local-exec'...
null_resource.gen_cluster_auth (local-exec): Executing: ["/bin/bash" "-c" "        ./c9-auth.sh\n        echo \"***********
null_resource.annotate: Provisioning with 'local-exec'...
null_resource.annotate (local-exec): Executing: ["/bin/bash" "-c" "        az1=$(echo eu-west-1a)\n        az2=$(echo eu-wes
null_resource.gen_cluster_auth (local-exec): C9_PID is 8487e9e186ab4c20b39264c36ebd4a38
null_resource.gen_cluster_auth (local-exec): local auth
null_resource.annotate (local-exec): eu-west-1a eu-west-1b eu-west-1c subnet-07d95eb90a2d0f5aa subnet-037153414a2da552e subn
null_resource.annotate (local-exec): Annotate nodes ......
null_resource.annotate (local-exec): CLUSTER is mycluster1
null_resource.annotate (local-exec): tfid is 4e05298ec6bc96e1
null_resource.annotate (local-exec): NAME                                         CREATED AT
null_resource.annotate (local-exec): eniconfigs.crd.k8s.amazonaws.com             2023-06-27T09:27:21Z
null_resource.annotate (local-exec): securitygrouppolicies.vpcresources.k8s.aws   2023-06-27T09:27:23Z
null_resource.annotate (local-exec): Descr EC2 instance i-0b28c94d508c3b9df ...
null_resource.annotate (local-exec): subnet subnet-07d95eb90a2d0f5aa zone eu-west-1a
null_resource.annotate (local-exec): subnet subnet-037153414a2da552e zone eu-west-1b
null_resource.annotate (local-exec): subnet subnet-03825ee07e5c9abae zone eu-west-1c
null_resource.annotate (local-exec): eu-west-1a
null_resource.annotate (local-exec): created eu-west-1a-pod-netconfig.yaml
null_resource.annotate (local-exec): eu-west-1b
null_resource.annotate (local-exec): created eu-west-1b-pod-netconfig.yaml
null_resource.annotate (local-exec): eu-west-1c
null_resource.annotate (local-exec): created eu-west-1c-pod-netconfig.yaml
null_resource.annotate (local-exec): apply the CRD eu-west-1a
null_resource.annotate (local-exec): eniconfig.crd.k8s.amazonaws.com/eu-west-1a-pod-netconfig created
null_resource.annotate (local-exec): apply the CRD eu-west-1b
null_resource.annotate (local-exec): eniconfig.crd.k8s.amazonaws.com/eu-west-1b-pod-netconfig created
null_resource.annotate (local-exec): apply the CRD eu-west-1c
null_resource.gen_cluster_auth (local-exec): Role ARN: arn:aws:iam::666763910423:role/eksworkshop-admin
null_resource.annotate (local-exec): eniconfig.crd.k8s.amazonaws.com/eu-west-1c-pod-netconfig created
null_resource.annotate (local-exec): pause 20s before annotate
null_resource.gen_cluster_auth (local-exec): Warning: resource configmaps/aws-auth is missing the kubectl.kubernetes.io/las
null_resource.gen_cluster_auth (local-exec): configmap/aws-auth configured
null_resource.gen_cluster_auth: Still creating... [10s elapsed]
null_resource.annotate: Still creating... [10s elapsed]
null_resource.gen_cluster_auth (local-exec): Name:         aws-auth
null_resource.gen_cluster_auth (local-exec): Namespace:    kube-system
null_resource.gen_cluster_auth (local-exec): Labels:       <none>
null_resource.gen_cluster_auth (local-exec): Annotations:  <none>

null_resource.gen_cluster_auth (local-exec): Data
null_resource.gen_cluster_auth (local-exec): ====
null_resource.gen_cluster_auth (local-exec): mapRoles:
null_resource.gen_cluster_auth (local-exec): ----
null_resource.gen_cluster_auth (local-exec): - groups:
null_resource.gen_cluster_auth (local-exec):   - system:bootstrappers
null_resource.gen_cluster_auth (local-exec):   - system:nodes
null_resource.gen_cluster_auth (local-exec):   rolearn: arn:aws:iam::666763910423:role/4e05298ec6bc96e1-eks-nodegroup-NodeI
null_resource.gen_cluster_auth (local-exec):   username: system:node:{{EC2PrivateDNSName}}

null_resource.gen_cluster_auth (local-exec): mapUsers:
null_resource.gen_cluster_auth (local-exec): ----
null_resource.gen_cluster_auth (local-exec): - userarn: arn:aws:iam::666763910423:role/eksworkshop-admin
null_resource.gen_cluster_auth (local-exec):   username: admin
null_resource.gen_cluster_auth (local-exec):   groups:
null_resource.gen_cluster_auth (local-exec):     - system:masters


null_resource.gen_cluster_auth (local-exec): BinaryData
null_resource.gen_cluster_auth (local-exec): ====

null_resource.gen_cluster_auth (local-exec): Events:  <none>
null_resource.gen_cluster_auth (local-exec): ***************************************************************************
null_resource.gen_cluster_auth: Creation complete after 10s [id=2959057410039000718]
null_resource.annotate: Still creating... [20s elapsed]
null_resource.annotate (local-exec): Found 2 nodes to annotate of 2
null_resource.annotate (local-exec): ip-10-0-1-180.eu-west-1.compute.internal eu-west-1a
null_resource.annotate (local-exec): kubectl annotate node ip-10-0-1-180.eu-west-1.compute.internal k8s.amazonaws.com/eniCo
null_resource.annotate: Still creating... [30s elapsed]
null_resource.annotate (local-exec): node/ip-10-0-1-180.eu-west-1.compute.internal annotated
null_resource.annotate (local-exec): ip-10-0-2-60.eu-west-1.compute.internal eu-west-1b
null_resource.annotate (local-exec): kubectl annotate node ip-10-0-2-60.eu-west-1.compute.internal k8s.amazonaws.com/eniCont
null_resource.annotate (local-exec): node/ip-10-0-2-60.eu-west-1.compute.internal annotated
null_resource.annotate (local-exec): Should see coredns on 100.64.x.y addresses ......
null_resource.annotate (local-exec): kubectl get pods -A -o wide | grep coredns
null_resource.annotate: Creation complete after 32s [id=5968836339862921197]

Apply complete! Resources: 4 added, 0 changed, 0 destroyed.

Outputs:

config-map-aws-auth = "local.config-map-aws-auth"
kubeconfig = "local.kubeconfig"
```

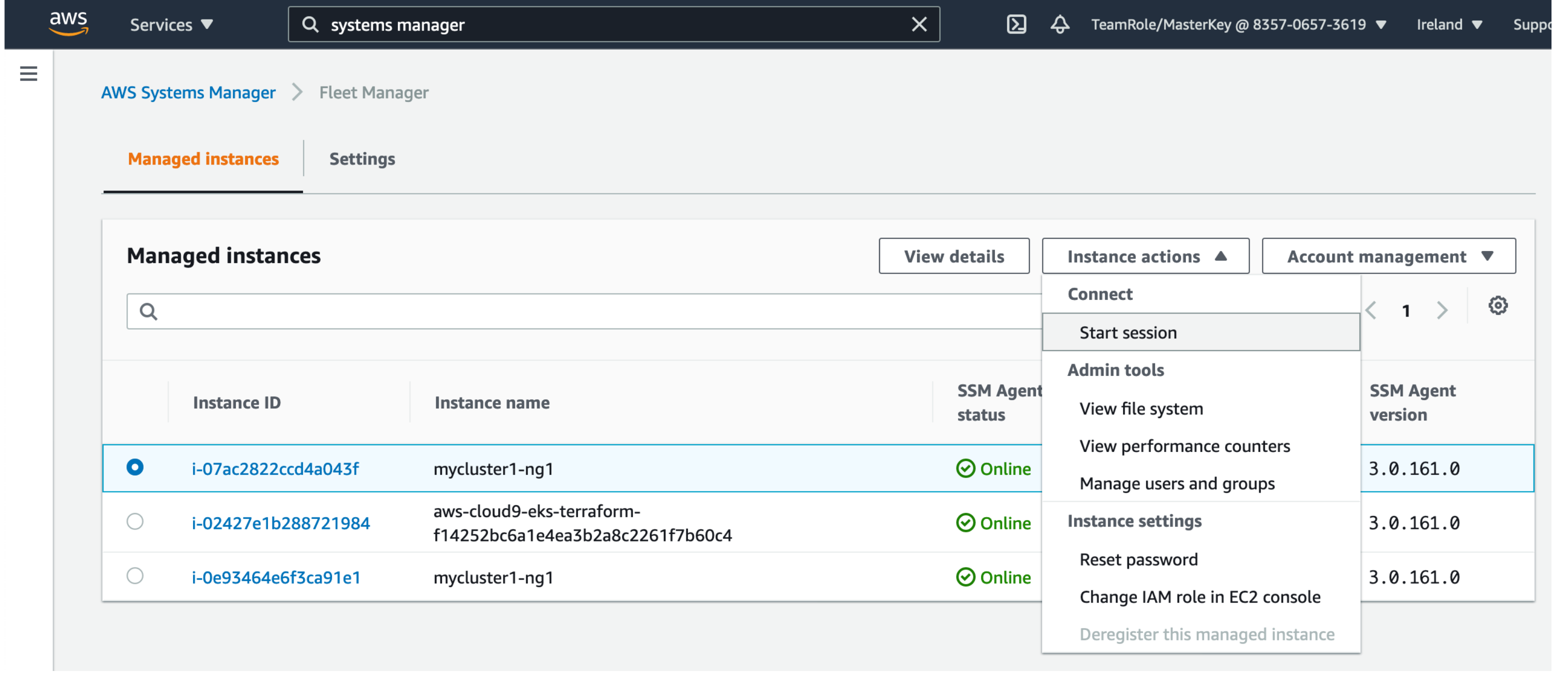
Check the custom software install

Our user_data.tf resource boot strapped our node into the cluster and installed the SSM agent.

You can check the SSM agent has worked by looking in the console for

`Systems Manager` then `Fleet Manager`

You should see the two worker node instances listed, as well as your Cloud9 IDE instance.



	Instance ID	Instance name	SSM Agent status	SSM Agent version
●	i-07ac2822ccd4a043f	mycluster1-ng1	Online	3.0.161.0
○	i-02427e1b288721984	aws-cloud9-eks-terraform-f14252bc6a1e4ea3b2a8c2261f7b60c4	Online	3.0.161.0
○	i-0e93464e6f3ca91e1	mycluster1-ng1	Online	3.0.161.0

You can start a SSM session and login to the node if required.

Select a node, `Instance actions` and then `Start session`

This provides a more secure way to access worker nodes compared with allowing ssh based access. It also enables other Systems Manager capabilities such as automation, inventory collection and patching.

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