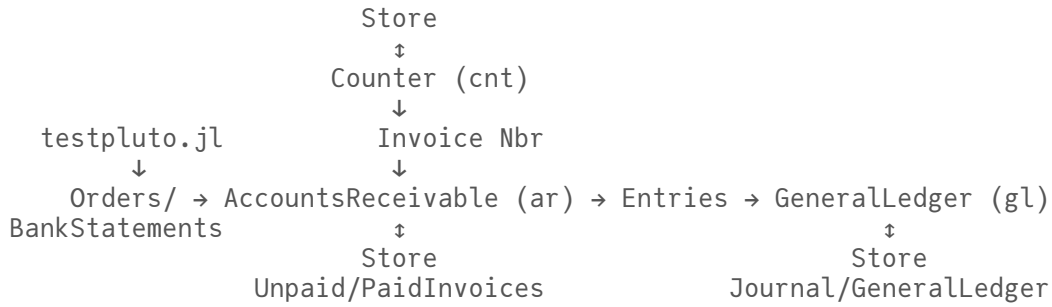
TCP Socket application with MicroK8s on Ubuntu 20.04

"MicroK8s is a powerful, lightweight, reliable production-ready Kubernetes distribution. It is an enterprise-grade Kubernetes distribution that has a small disk and memory footprint while offering carefully selected add-ons out-the-box, such as Istio, Knative, Grafana, Cilium and more. Whether you are running a production environment or interested in exploring K8s, MicroK8s serves your needs," see Introduction to MicroK8s.

The model

AccountReceivable and GeneralLedger are microservices. We use sockets for communication.

To create statefulset pods we used Suyash Mohan article Setting up PostgreSQL Database on Kubernetes as a guideline.



Check whether ar-statefulset, gl-statefullset and cnt-statefullset pods are running

Run the next command from the terminal:

microk8s.kubectl get pods -n socket-ns

```
NAME                READY   STATUS    RESTARTS   AGE
cnt-statefulset-0   2/2     Running   0          160m
gl-statefulset-0    2/2     Running   0          159m
gl-statefulset-1    2/2     Running   0          159m
ar-statefulset-1    2/2     Running   0          98m
ar-statefulset-0    2/2     Running   0          97m
```

If pods are not running use next commands from the terminal

- Install microk8s: **sudo snap install microk8s –classic**
- Enable microk8s build-in apps: **microk8s enable registry dashboard dns istio storage**
- Clone files from GitHub: **git clone https://github.com/rbontekoe/ar.git**
- Enter the folder with the downloaded files: **cd ar**
- Download Julia 1.6.5: **curl -O https://julialang-s3.julialang.org/bin/linux/x64/1.6/julia-1.6.5-linux-x86_64.tar.gz**
- Create accounts receivable image: **docker build –no-cache -f ar.Dockerfile -t localhost:32000/i_ar:v1.0.16 .**
- Copy to local registry: **docker push localhost:32000/i_ar:v1.0.16**
- Create general ledger image: **docker build –no-cache -f gl.Dockerfile -t localhost:32000/i_gl:v1.0.3 .**
- Copy to local registry: **docker push localhost:32000/i_gl:v1.0.3**
- Create counter image: **docker build –no-cache -f cnt.Dockerfile -t localhost:32000/i_cnt:v1.0.1 .**
- Copy to local registry: **docker push localhost:32000/i_cnt:v1.0.1**
- **microk8s.kubectl apply -f ar-storage.yaml**
- **microk8s.kubectl apply -f cnt-storage.yaml**
- **microk8s.kubectl apply -f gl-storage.yaml**

Import AppliAR.jl

```
import Pkg; Pkg.add(url="https://github.com/rbontekoe/AppliAR")
```

```
    Updating git-repo `https://github.com/rbontekoe/AppliAR`
    Updating registry at `~/.julia/registries/General`
   Resolving package versions...
  No Changes to `~/.julia/environments/v1.6/Project.toml`
  No Changes to `~/.julia/environments/v1.6/Manifest.toml`
Precompiling project...
¤[32m  ✓ ¤[39mPluto

¤[32m  ✓ ¤[39mPlutoSliderServer

  2 dependencies successfully precompiled in 16 seconds (91 already precompi
led)
```

Load the files

```
using Sockets, Serialization, AppliSales, AppliAR, AppliGeneralLedger, DataFrames, Query
```

Delete the old data files

Go to the terminal and delete the next files:

sudo rm /var/data-ar/*

Connect to AppliAR.jl, create and process the orders

```
clientside = TCPSocket(RawFD(21) open, 0 bytes waiting)
```

```
clientside = connect(ip"127.0.0.1", 30012) # connect to accounts receivable pod
```

```
block_run = false
```

```
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```

```
if block_run
    sales = AppliSales.process() # create sales orders
    serialize(clientside, sales) # send orders to account receivable
end
```

	accountid	customerid	invoice_nbr	debit	credit	descr
1	1300	"Scrooge Investment Bank"	"1001"	1210.0	0.0	"Learn Smiling'
2	1300	"Duck City Chronicals"	"1002"	2420.0	0.0	"Learn Smiling'
3	1300	"Donalds Hardware Store"	"1003"	1210.0	0.0	"Learn Smiling'
4	1300	"Duck City Chronicals"	"1002"	0.0	2420.0	"Learn Smiling'
5	1300	"Donalds Hardware Store"	"1003"	0.0	1210.0	"Learn Smiling'

```
begin
    r = AppliGeneralLedger.read_from_file("/var/data-ar/generalledger.txt")
    df = r |> @filter(_.accountid == 1300) |> DataFrame
    df[:, [:accountid, :customerid, :invoice_nbr, :debit, :credit, :descr]]
end
```

Load and process the bank statements

```
if block_run
    stms = AppliAR.read_bank_statements("./bank-kubernetes.csv") # retrieve the bankstatements
    serialize(clientside, stms) # create paid invoices and update general ledger
end
```

Display Accounts Receivable

Other accounts are:

```
8000 - Sales
1150 - Bank
4000 - VAT
1300 - Accounts Receivable
```

```
accountid = 1300;
```

	accountid	customerid	invoice_nbr	debit	credit	descr
1	1300	"Scrooge Investment Bank"	"1001"	1210.0	0.0	"Learn Smiling'
2	1300	"Duck City Chronicals"	"1002"	2420.0	0.0	"Learn Smiling'
3	1300	"Donalds Hardware Store"	"1003"	1210.0	0.0	"Learn Smiling'
4	1300	"Duck City Chronicals"	"1002"	0.0	2420.0	"Learn Smiling'
5	1300	"Donalds Hardware Store"	"1003"	0.0	1210.0	"Learn Smiling'

```
begin
    r2 = AppliGeneralLedger.read_from_file("/var/data-ar/generalledger.txt")
    df2 = r2 |> @filter(_.accountid == accountid) |> DataFrame
    df2[:, [:accountid, :customerid, :invoice_nbr, :debit, :credit, :descr]]
end
```

```
Enter cell code...
```

Display the status of the unpaid invoices

	id_inv	csm	inv_date	amount	days
1	"1001"	"Scrooge Investment Bank"	2022-03-30	1210.0	1 day

```
begin
    r1 = AppliAR.aging("/var/data-ar/unpaid-invoices.txt", "/var/data-ar/paid-
    invoices.txt")
    result = DataFrame(r1)
end
```