

# Measurements in AWS VM2VM (#4a)

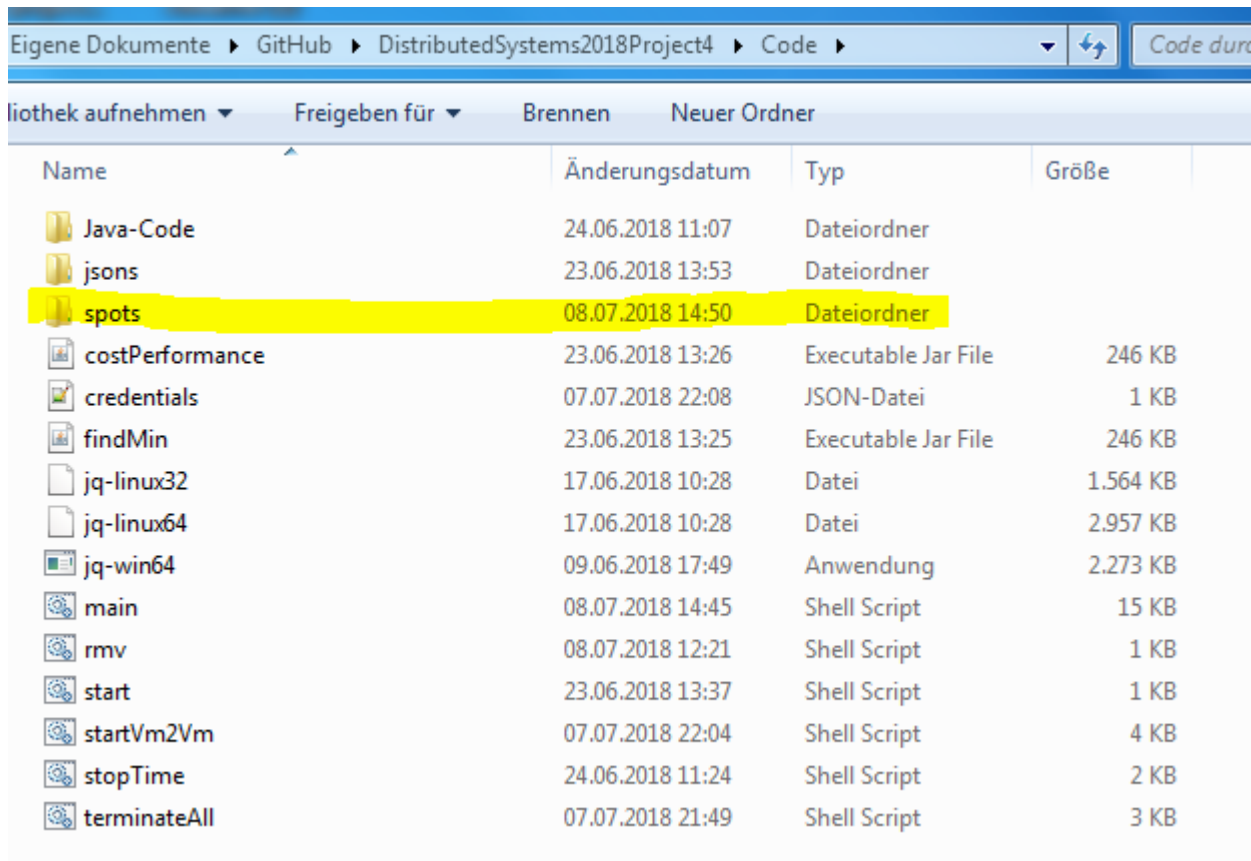
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# main.sh

- 1. Generate folders for every instance-type and its regions



The screenshot shows a Windows File Explorer window with the address bar displaying the path: Eigene Dokumente > GitHub > DistributedSystems2018Project4 > Code. The window title is "Code durchsuchen". The main area shows a list of files and folders. The 'spots' folder is highlighted in yellow. The table below represents the data shown in the screenshot.

Name	Änderungsdatum	Typ	Größe
Java-Code	24.06.2018 11:07	Dateiordner	
jsons	23.06.2018 13:53	Dateiordner	
spots	08.07.2018 14:50	Dateiordner	
costPerformance	23.06.2018 13:26	Executable Jar File	246 KB
credentials	07.07.2018 22:08	JSON-Datei	1 KB
findMin	23.06.2018 13:25	Executable Jar File	246 KB
jq-linux32	17.06.2018 10:28	Datei	1.564 KB
jq-linux64	17.06.2018 10:28	Datei	2.957 KB
jq-win64	09.06.2018 17:49	Anwendung	2.273 KB
main	08.07.2018 14:45	Shell Script	15 KB
rmv	08.07.2018 12:21	Shell Script	1 KB
start	23.06.2018 13:37	Shell Script	1 KB
startVm2Vm	07.07.2018 22:04	Shell Script	4 KB
stopTime	24.06.2018 11:24	Shell Script	2 KB
terminateAll	07.07.2018 21:49	Shell Script	3 KB

# main.sh

igene Dokumente ▶ GitHub ▶ DistributedSystems2018Project4 ▶ Code ▶ spots ▶

nen In Bibliothek aufnehmen ▼ Freigeben für ▼ E-Mail Brennen

Name	Änderungsdatum
c5.large	08.07.2018 14:53
c5.xlarge	08.07.2018 14:50
m5.2xlarge	08.07.2018 14:50
m5.large	08.07.2018 14:50
m5.xlarge	08.07.2018 14:50
t2.large	08.07.2018 14:50
t2.medium	08.07.2018 14:50
t2.micro	08.07.2018 14:50
t2.small	08.07.2018 14:50
t2.xlarge	08.07.2018 14:50

DistributedSystems2018Project4 ▶ Code ▶ spots ▶ c5.large ▶

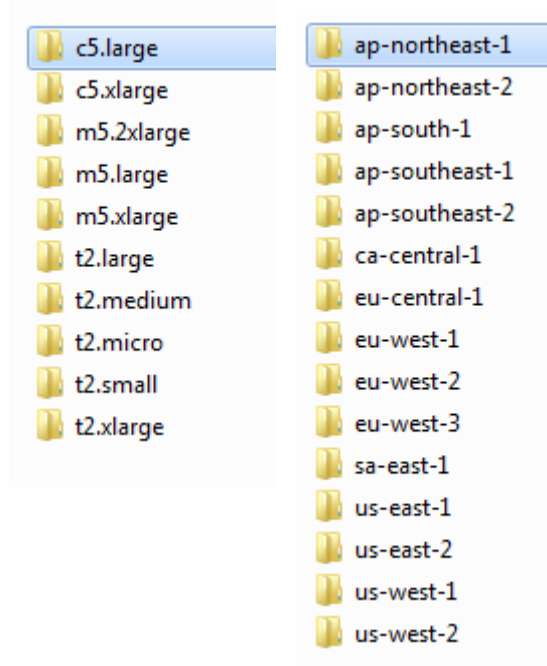
othek aufnehmen ▼ Freigeben für ▼ Brennen Neuer Ordner

Name	Änderungsdatum	Typ
ap-northeast-1	08.07.2018 14:50	Dateiordner
ap-northeast-2	08.07.2018 14:50	Dateiordner
ap-south-1	08.07.2018 14:50	Dateiordner
ap-southeast-1	08.07.2018 14:50	Dateiordner
ap-southeast-2	08.07.2018 14:50	Dateiordner
ca-central-1	08.07.2018 14:50	Dateiordner
eu-central-1	08.07.2018 14:50	Dateiordner
eu-west-1	08.07.2018 14:50	Dateiordner
eu-west-2	08.07.2018 14:50	Dateiordner
eu-west-3	08.07.2018 14:50	Dateiordner
sa-east-1	08.07.2018 14:50	Dateiordner
us-east-1	08.07.2018 14:50	Dateiordner
us-east-2	08.07.2018 14:50	Dateiordner
us-west-1	08.07.2018 14:50	Dateiordner
us-west-2	08.07.2018 14:50	Dateiordner

# main.sh

- 2. Gather prices for all instance-types in each region and store them in every region folder of each instance-type

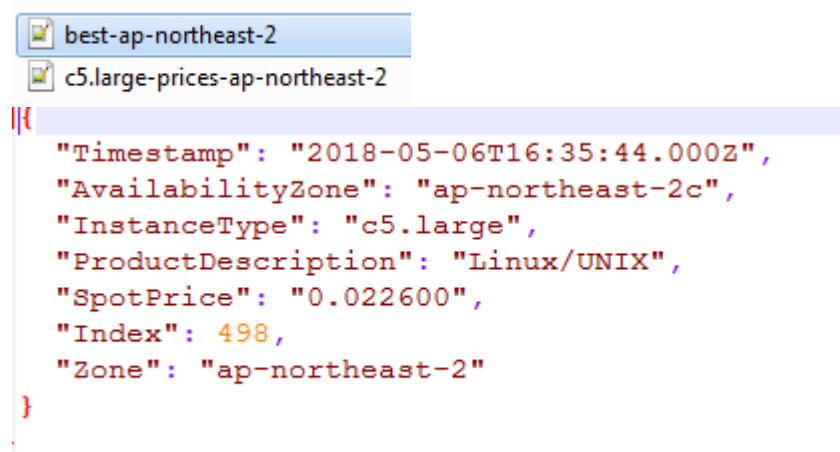
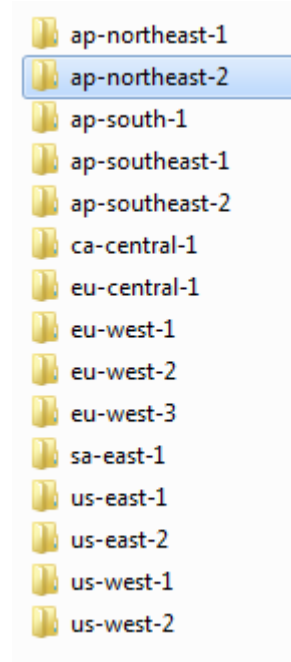
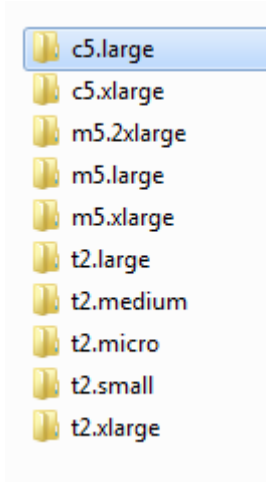
# main.sh



## 3. findMin.jar

- 3.1 Find the best price for all regions of each instance-type
- 3.2 Extract the 2 cheapest spot-instance entries from above and save it in the instance-type folder

# findMin.jar



# findMin.jar

- c5.large
- c5.xlarge
- m5.2xlarge
- m5.large
- m5.xlarge
- t2.large
- t2.medium
- t2.micro
- t2.small
- t2.xlarge

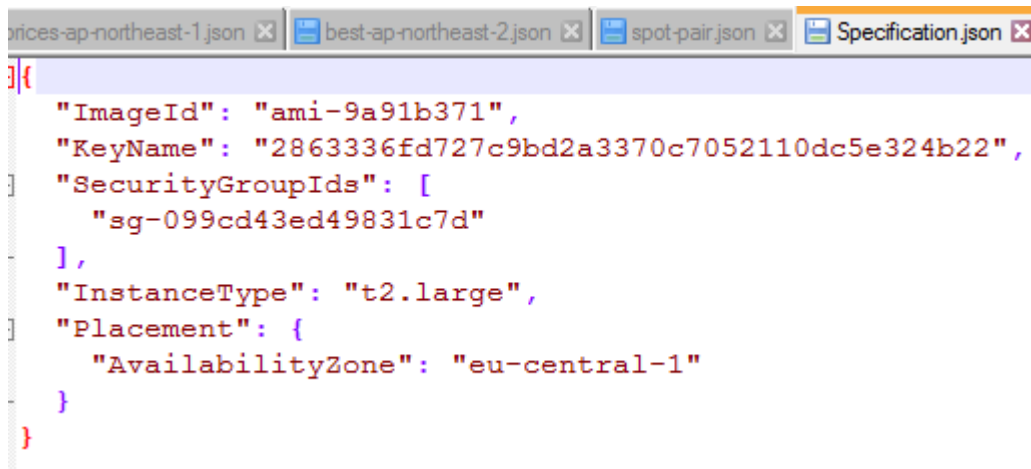
- ap-northeast-1
- ap-northeast-2
- ap-south-1
- ap-southeast-1
- ap-southeast-2
- ca-central-1
- eu-central-1
- eu-west-1
- eu-west-2
- eu-west-3
- sa-east-1
- us-east-1
- us-east-2
- us-west-1
- us-west-2
- spot-pair

```
[  
  {  
    "Timestamp": "2018-04-25T22:30:44.000Z",  
    "AvailabilityZone": "us-east-2b",  
    "InstanceType": "c5.xlarge",  
    "ProductDescription": "Linux/UNIX",  
    "SpotPrice": "0.036100",  
    "Index": 1044,  
    "Zone": "us-east-2"  
  },  
  {  
    "Timestamp": "2018-05-10T20:10:12.000Z",  
    "AvailabilityZone": "ap-south-1a",  
    "InstanceType": "c5.xlarge",  
    "ProductDescription": "Linux/UNIX",  
    "SpotPrice": "0.043700",  
    "Index": 422,  
    "Zone": "ap-south-1"  
  }  
]
```



# main.sh

- 4. Prepare Specification file for spot-request (Sec-group, Key, Image-Id, ect...)



The screenshot shows a code editor with four tabs: "prices-ap-northeast-1.json", "best-ap-northeast-2.json", "spot-pair.json", and "Specification.json". The "Specification.json" tab is active, displaying a JSON object with the following fields:

```
[{"ImageId": "ami-9a91b371",
  "KeyName": "2863336fd727c9bd2a3370c7052110dc5e324b22",
  "SecurityGroupIds": [
    "sg-099cd43ed49831c7d"
  ],
  "InstanceType": "t2.large",
  "Placement": {
    "AvailabilityZone": "eu-central-1"
  }
}]
```

# main.sh

- 5. Send a request for 2 instances in same region and try to acquire them (get running instance ids)

```
[*] Requesting Spot-Instance for c5.xlarge in ap-south-1...
[*] Request-status for m5.2xlarge in ca-central-1: pending-fulfillment | pending-fulfillment
[*] Request-status for c5.xlarge in ap-south-1: pending-fulfillment | pending-fulfillment
[*] Request-status for c5.large in ap-south-1: pending-fulfillment | pending-fulfillment
[*] Request-status for m5.2xlarge in ca-central-1: fulfilled | fulfilled
[*] Got spot-instance for m5.2xlarge in ca-central-1 with id: i-07ae79a0a39da6c07 | i-0ad18e2fc28438bc1
[*] Request-status for c5.xlarge in ap-south-1: fulfilled | fulfilled
[*] Got spot-instance for c5.xlarge in ap-south-1 with id: i-0f4eb2688284e0d71 | i-09fc6780a9f1746af
[*] Request-status for c5.large in ap-south-1: fulfilled | fulfilled
[*] Got spot-instance for c5.large in ap-south-1 with id: i-063f5580fd6a0a328 | i-0941ab11a67c69441
[*] Instance-status for m5.2xlarge in ca-central-1: "running" | "running"
[*] Instance-status for c5.xlarge in ap-south-1: "pending" | "pending"
[*] Instance-status for c5.large in ap-south-1: "pending" | "pending"
[*] Instance-status for c5.xlarge in ap-south-1: "running" | "running"
[*] Instance-status for c5.large in ap-south-1: "running" | "running"
```

## 6. startVm2Vm.sh

- 6.1 Setup aws config
- 6.2 Connect to one instance and transfer key and the measurement script

```
stopTime.sh 100% 1409 13.8KB/s 00:00  
c1903d1701a0264d6af077d28c20191f726ebe00.pem 100% 1671 16.4KB/s 00:00
```

- 6.3 Once connected generate files and start measurement script

```
script="
fallocate -l 10M 0.dat;
fallocate -l 200M 1.dat;
fallocate -l 300M 2.dat;
fallocate -l 400M 3.dat;
fallocate -l 500M 4.dat;
fallocate -l 1G 5.dat;
fallocate -l 2G 6.dat;
```

## 6.4 stopTime.sh

- 6.4.1 Transfer 7 files 5 times and take average time for each transmission of a file

```
declare -A matrix
for (( j=0; j<5; j++ ))
do
    for (( i=0; i<=6; i++ ))
    do
        startTime=$(date +%s%N)
        echo "[${architec}][${zone}] Run $j: Transferring file $i.dat ..."
        scp -i ${keyName}.pem -o StrictHostKeyChecking=no $i.dat ec2-user@${dnsName}:~/fromVM &
        loop=$!
        spinner $loop &
        wait $!
        endTime=$(date +%s%N)
        totalTime=$(expr $endTime - $startTime)
        totalTime=$(expr $totalTime / 1000000)
        matrix[$i,$j]=$totalTime
    done
done
```

- 6.4.2 Save the result as a file

```
>> "$zone-VM1toVM2.json"
```

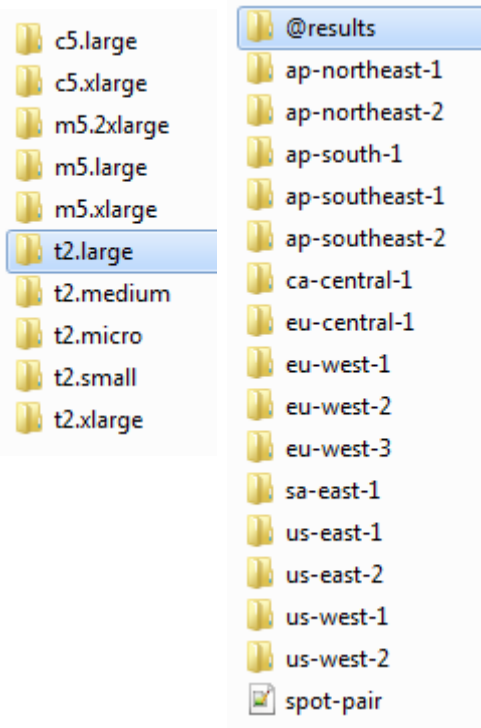
# startVm2Vm.sh

- 6.5 download the result file and fill it with necessary information

```
storepath2="$storepath/@results"  
scp -i "$keypath$keyName.pem" -o StrictHostKeyChecking=no  
ec2-user@$dnsName:$zone-VM1toVM2.json "$(pwd)/$storepath2/"
```

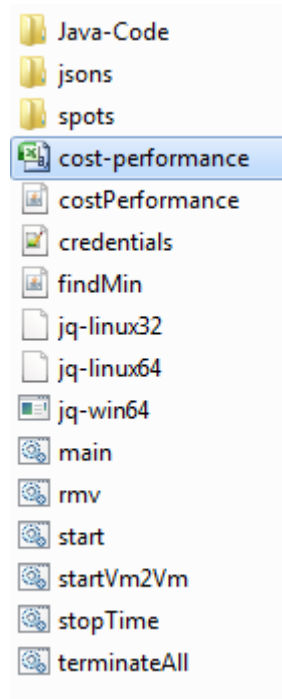
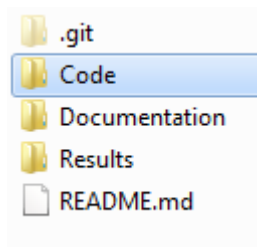
# 7. cost-performance.jar

- 7.1 crawl through every instance-type folder and check the results



# cost-performance.jar

- 7.2 create one single CSV-File for all results with the 2 zones of each instance-type



	A	B	C	D
1	Cost-Performance Table			
2	1st Zone (Cheapest)			
3	Instance-Type	Speed [MB/s]	Cost [\$ /h]	Zone
4	t2.micro	24.0477	0.0035	us-east-1
5	t2.small	36.703475	0.0069	us-east-1
6	t2.medium	71.002931	0.0139	us-east-1
7	t2.large	93.105729	0.0278	us-east-1
8	t2.xlarge	112.7288	0.0557	us-east-1
9	m5.large	133.36751	0.0163	us-east-2
10	m5.xlarge	178.243995	0.0326	us-east-2
11	m5.2xlarge	206.250831	0.0711	us-east-2
12	c5.large	136.495497	0.0168	us-east-2
13	c5.xlarge	176.791278	0.0361	us-east-2
14				
15	2nd Zone (2nd-Cheapest)			
16	Instance-Type	Speed [MB/s]	Cost [\$ /h]	Zone
17	t2.micro	22.104369	0.0035	us-east-2
18	t2.small	36.10005	0.0069	us-east-2
19	t2.medium	68.375956	0.0139	us-east-2
20	t2.large	89.669032	0.0278	us-east-2
21	t2.xlarge	119.178847	0.0557	us-east-2
22	m5.large	136.253007	0.0251	ca-central-1
23	m5.xlarge	182.129052	0.0503	ca-central-1
24	m5.2xlarge	202.745813	0.1006	ca-central-1
25	c5.large	131.586008	0.0219	ap-south-1
26	c5.xlarge	184.984378	0.0437	ap-south-1
27				