Lesson 2

A simple CRUD application

https://www.nimbella.com

Plan

- create a nimbella project
  - use jquery and bootstrap
  - sample: "secret" message encoder
- web project with framework
  - use redis for storage
  - use svelte for front-end
  - sample: a "crud" application

A Nimbella project

- Collection of
    - actions (backend)
    - web assets (front-end)
    - redis (storage)
    - bucket (uploads)
    - more...
- Managed with `nim`

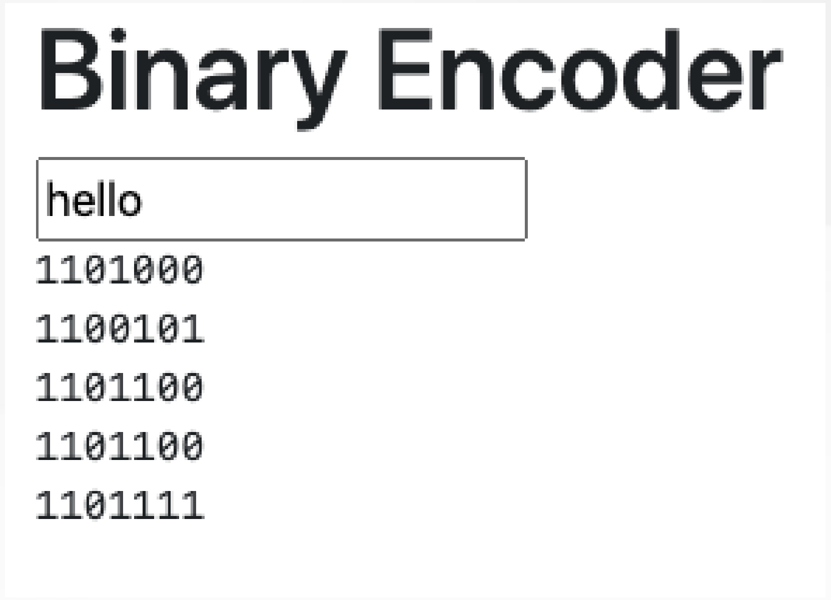
Conventions over configurations

- Actions are in `packages` folder
  - Subfolders are packages
  - Use "default" for "no package" actions
- A single file with extension determine the actions
  - It can also be a directory
- Deploy with `nim project deploy <project-dir>`

Example: 'secret' message encoder

Translate a "plain text message" in binary numbers.

- backend action
  - encode the messages
- front end action
  - render the message
- uses jquery for ajax and bindings



```
1101000
1100101
1101100
1101100
1101111
```

Convert text in binary string

```
// Convert text in binary string
function main(args) {
    let text = args.text || ""
    let res =  text.split("").map(
      function (x) {
        return x.charCodeAt(0).toString(2)
      }
    )
    return {
        "body": res.join("\n")
    }
}
```

Testing locally

- Recommended practice before publishing
- With node.js:
  - start `node`
  - `eval(require("fs").readFileSync(<file>, 'utf-8'))`
  - invoke `main(<args>)`
- Recommended: write "unit tests"
  - for example with `jest`

Testing locally the binary action

```
# testing locally the binary action
node
eval(require("fs").readFileSync("encoder/packages/default/binary.js", 'utf-8'))
main({"text":"hello"})
main({})
```

Deploy encoder

```
# deploy encoder
mkdir -p encoder/packages/default
cp src/binary.js encoder/packages/default
nim project deploy encoder
nim action invoke binary -p text hello
```

Web Content

- placed under `<project>/web`
- uploaded when deploying
- actions accessible with `/api` prefix

Encoder User Interface

```html
<!DOCTYPE html>
<html>
<head>
    <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css">
    <script src="https://code.jquery.com/jquery-3.3.1.min.js" ></script>
</head>
<body>
  <div class="container">
    <h1>Binary Encoder</h1>
    <input type="text" id="input">
    <pre id="output"></pre>
  </div>
  <script src="index.js" ></script>
</body>
</html>
```

Encoder Logic

```
$("#input").keyup(function () {
    $.post("/api/default/binary",
      {
        text: $("#input").val()
      },
      function(data) {
        $("#output").text(data)
      }
    )
})
```

Deploy web content

```
# deploy web content
find encoder
mkdir -p encoder/web
cp src/index.html encoder/web
cp src/index.js encoder/web
nim project deploy encoder
```

Local Development

Common Problems:

- Not everything works without a web server
- CORS! Requests require same origin

Solution:

- use a local web server and setup a proxy to Nimbella API

```
http-server encoder/web --proxy https://$(nim auth current)-apigcp.nimbella.io
```

Install and run local server

```
# install and run local server
npm install -g http-server
http-server encoder/web --proxy https://$(nim auth current)-apigcp.nimbella.io
# in another terminal
vi encoder/web/index.html
```

Options for `project deploy`

- use `--incremental` to deploy only changes
- use `--exclude=<path>` to exclude directories (or files)

```
nim project deploy --incremental encoder
nim project deploy --exclude=web encoder
```

Examples of incremental update

```
## examples of incremental update
# edit frontend
vi encoder/web/index.html
# deploy only changed files
nim project deploy encoder --incremental
# edit backend
vi encoder/packages/default/binary.js
# deploy excluding web folder
nim project deploy encoder --exclude=web
```

Using Redis

- A "in-memory" key-value store
- Data is persisted on disk and backed up
  - can be used as data store
- Very fast
  - can be also used as cache
- Works as shared state
  - multiple actions can read and write

Set in Redis (v1)

```
// set.js v1
function main(args) {
    let db = require("@nimbella/sdk").redis()
    let key = args.key
    let value = args.value
    return db.setAsync(key, value)
    .then(reply => { return {"body": reply}})
    .catch(err =>  { return {"body": err}})
}
```

Get in Redis (v1)

```
// get.js v1
function main(args) {
    let db = require("@nimbella/sdk").redis()
    let key = args.key
    return db.getAsync(key)
    .then(reply => { return {"body": reply } })
    .catch(err =>  { return {"body": err}})
}
```

Setup address project

```
# setup address project
mkdir -p address/packages/addr
cp src/set1.js address/packages/addr/set.js
cp src/get1.js address/packages/addr/get.js
nim auth current
nim project deploy address
```

Testing get/set

```
# testing get/set
## set then get
nim action invoke addr/set -p key hello -p value world
nim action invoke addr/get -p key hello
nim action invoke addr/get -p key hi
# change value
nim action invoke addr/set -p key hello -p value earth
nim action invoke addr/get -p key hello
```

Using `nim kv`

```
# nim kv support
nim kv
nim kv list
nim kv get hello
nim kv clean
nim kv list
```

Write a record

- `set.js` v2 diff:

```
<     let key = args.key
<     let value = args.value
===
>     let key = "address:"+args.name
>     let value = JSON.stringify({
>             "name": args.name || "",
>             "company":  args.company  || "",
>             "phone": args.phone || ""
>     })
```

Read a record

- `get.js` v2 diff:

```
3c3
<       let key = args.key
===
>       let key = "address:"+args.name
5c5
<       .then(reply => { return {"body": reply } })
===
>       .then(reply => { return JSON.parse(reply || "")})
```

del.js

```
// del.js
function main(args) {
    let db = require("nim").redis()
    let key = "address:"+args.name
    return db.delAsync(key)
    .then(reply => { return {"body": reply}})
    .catch(err =>  { return {"body": err}})
}
```

Deploy record actions

```
# Deploy fixed actions
cp src/set2.js address/packages/addr/set.js
cp src/get2.js address/packages/addr/get.js
cp src/del.js address/packages/addr/del.js
find address
nim project deploy address
```

Test record actions

```
# Test the actions
nim action invoke addr/set -p name Michele -p company Nimbella -p phone 392
nim action invoke addr/get -p name Michele
nim action invoke addr/del -p name Michele
nim action invoke addr/get -p name Michele
```

List all records

```
// loading all the records
function main() {
    let db = require("@nimbella/sdk").redis()
    return db.keysAsync("address:*")
    .then(reply => {
        return reply.length == 0 ? []
          : db.mgetAsync(reply)
        })
    .then(reply => {
        return {
        "body": reply.map(JSON.parse)
       }
    })
    .catch(err => { return { "body": err}})
}
```

Dissecting `all.js`:

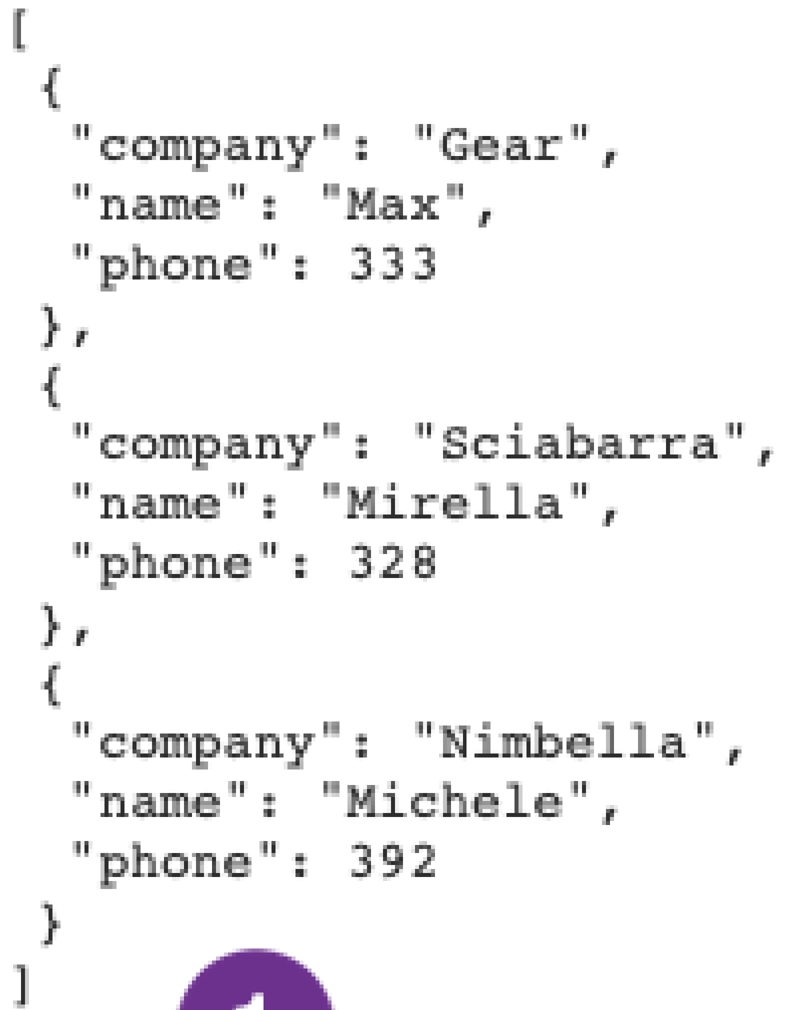
- `db.keysAsync("address:*").then(reply => ...)`:
  reply= `[ 'address:Mirella', 'address:Michele' ]`

- `db.mgetAsync(reply).then(reply => ... )`:
  reply =
  ```
  [ '{"name":"Mirella","company":"Sciabarra","phone":328}',
  '{"name":"Michele","company":"Nimbella","phone":392}' ]
  ```

- `reply.map(['{}', '{"a":1}])`
  = `[{},{"a":1}]`

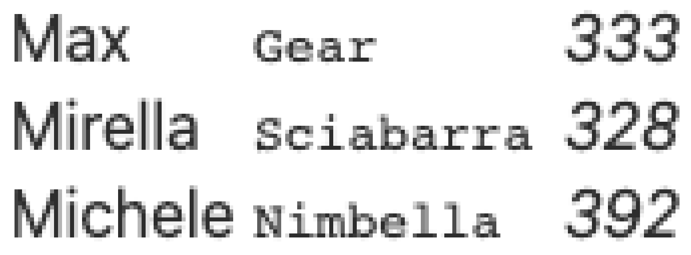
Deploy and test `all.js`

```
# add all
cp src/all.js address/packages/addr/all.js
nim project deploy address
nim action invoke addr/all
nim action invoke addr/set -p name Michele -p company Nimbella -p phone 392
nim action invoke addr/set -p name Mirella -p company Sciabarra -p phone 328
nim action invoke addr/all
curl $(nim action get addr/all --url)
```



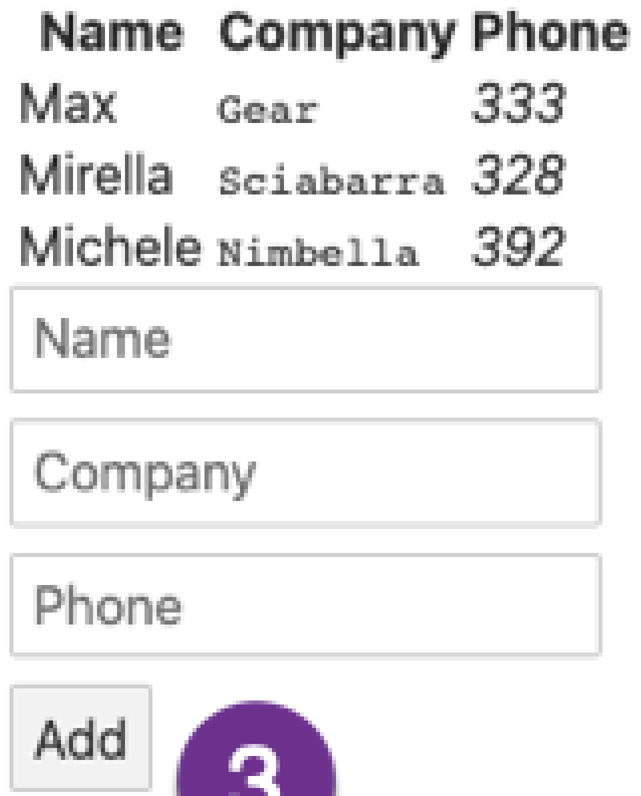
```
[
 {
  "company": "Gear",
  "name": "Max",
  "phone": 333
 },
 {
  "company": "Sciabarra",
  "name": "Mirella",
  "phone": 328
 },
 {
  "company": "Nimbella",
  "name": "Michele",
  "phone": 392
 }
]
```

1



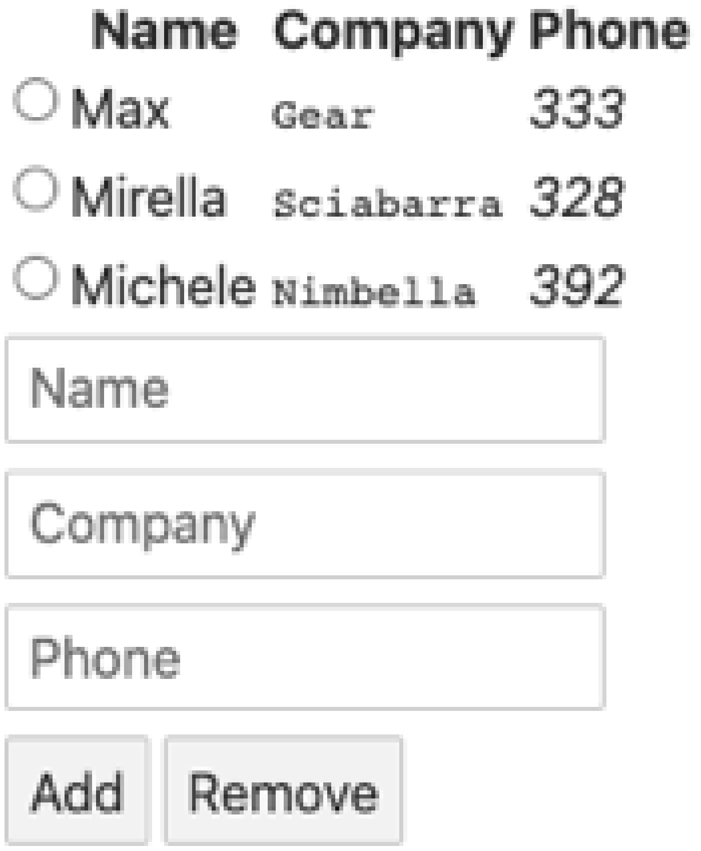
Max	Gear	333
Mirella	Sciabarra	328
Michele	Nimbella	392

2



Name	Company	Phone
Max	Gear	333
Mirella	Sciabarra	328
Michele	Nimbella	392

3



	Name	Company	Phone
○	Max	Gear	333
○	Mirella	Sciabarra	328
○	Michele	Nimbella	392

4

Create a svelte app

- `npx degit sveltejs/template web` uses a template
- requires some configuration:
  - `project.yml`
  - `web/.include`

Deploy Web Content

```
cd address
rm -Rvf web
npx degit sveltejs/template web
echo "public" >web/.include
echo -e "bucket:\n  strip: 1" >project.yml
cd ..
nim project deploy address
```

How to use a subfolder

- `project.yml` (strip one level):

```yaml
bucket:
  strip: 1
```

- `web/.include` (pick the subfolder `public`):

```
public
```

Svelte is "reactive"

- declare: `let data = ""`
- use: `{data}`
- assign: `data = "hello"`
  - triggers view update
- `onMount` executed when view ready

Load All data

```
<script>
  // retrieve data
  let data = []
  function all()  {
      fetch("/api/addr/all")
      .then(r => r.json())
      .then(d => data = d)
  }
  // init
  import { onMount } from 'svelte'
  onMount(all)
</script>

<pre>{JSON.stringify(data, null, "  ")}</pre>
```

Deploy and Test v1

```
# deploy and test
cp src/App1.svelte address/web/src/App.svelte
nim project deploy address
# show
nim action invoke addr/set -p name Max -p company Gear -p phone 333
```

Svelte templates

- reactive
  - just update variable
- `{#each data as row}`
  - iterates array assigning to row
- `{row.name}`
  - render value
- `{/each}`
  - closes block

Adding the table

```
<table>
  <tr>
    <th>Name</th>
    <th>Company</th>
    <th>Phone</th>
  </tr>
  {#each data as row}
      <tr>
        <td>{row.name}</td>
        <td><tt>{row.company}</tt></td>
        <td><i>{row.phone}</i></td>
      </tr>
  {/each}
</table>
```

Deploy v2

```
cp src/App2.svelte address/web/src/App.svelte
nim project deploy address
```

Form

```
let form = {}
function add() {
    fetch("/api/addr/set",
    {
        method: 'POST',
        headers: { 'Content-Type': 'application/json' },
        body: JSON.stringify(form)
    })
    .then(all)
    .then(() => { form = {}})
}
```

Svelte Bindings

- `<input bind:value={form.name}>`
  - value stored into `form.name`

Svelte events

- `<button on:click={add}>Add</button>`
  - event `click` execute function `add`

Form HTML

```
<form>
  <input placeholder="Name"
   bind:value={form.name}>
  <br>
  <input placeholder="Company"
   bind:value={form.company}>
  <br>
  <input placeholder="Phone"
   bind:value={form.phone}>
  <br>
</form>
<button on:click={add}>Add</button>
```

Deploy v3

```
# deploy v3
cp src/App3.svelte address/web/src/App.svelte
nim project deploy address
```

Remove

```
let select
function remove() {
  fetch("/api/addr/del?name="+select)
  .then(all)
}
```

Remove Changes

```
 <table>
    <tr>
+      <th></th
       <th>Name</th>
...
       <tr>
+        <td>
+          <input type="radio"
+           bind:group={select}
+           value={row.name} />
+        </td>
         <td>{row.name}</td>
...
  <button on:click={add}>Add</button>
+ <button on:click={remove}>Remove</button>
```

Deploy v4

```
# deploy v4
cp src/App4.svelte address/web/src/App.svelte
nim project deploy address
```

Exercise for Certification

Implement the "edit" button.

The goal is to load in the form the selected value, allowing to edit it (change and save).