FREE eBook

# LEARNING heroku

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#heroku

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# About

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# Chapter 1: Getting started with heroku

## Remarks

Heroku is a popular Platform-as-a-Service provider (PaaS) which makes it easy for developers to deploy web applications without an operations team. Heroku has been around since 2007, and is now owned by Salesforce.

This section provides an overview of what Heroku is, and why a developer might want to use it.

It should also mention any large subjects within Heroku, and link out to the related topics. Since the Documentation for Heroku is new, you may need to create initial versions of those related topics.

## Examples

### Installation or Setup

To create and manage Heroku apps locally you'll need the Heroku Toolbelt, here are some ways to get it.

# Download

Download the Heroku Toolbelt installer from Heroku's website.

# Homebrew

Install `heroku` with `brew`:

```
brew install heroku
```

# Debian/Ubuntu

Run this script:

```
wget -O- https://toolbelt.heroku.com/install-ubuntu.sh | sh
```

This script adds the Heroku repository to apt, installs the Heroku release key, installs the Heroku Toolbelt and then installs Ruby if you need it.

As with any script you find online and pipe directly to bash we highly recommend you read the

source first.

### Using the Heroku Toolbelt

# Create an application

```
heroku create your-app-name
```

# Deploy to Heroku

```
git push heroku master
```

# Open your application in a browser

```
heroku open your-app-name
```

# List Heroku commands

```
heroku commands
```

# General help

```
heroku help
```

# Help for a specific command

```
heroku help <command>
```

### Creating Heroku Applications

You can use the `heroku create` command to create a Heroku application. Each application you deploy to Heroku has its own code base, environment variables, addons, etc.

Each Heroku application has a globally unique name. If you try to create a Heroku application whose name is already taken, you will get an error.

Here's how you can create a new Heroku application:

```
heroku create [app_name]
```

If you don't specify an application name when running `heroku create`, Heroku will create a random application name for you.

You can also specify the Amazon region in which your Heroku application should be created. By default, all Heroku applications are created in the `us` region. If you'd like to change the region, you can do so by creating the application like so:

```
heroku create [app_name] --region eu
```

Right now, there are only two public regions: `us`, and `eu` (Europe).

Read Getting started with heroku online: https://riptutorial.com/heroku/topic/959/getting-started-with-heroku

# Chapter 2: Buildpack

## Examples

### Setting Buildpacks

Heroku officially supports buildpacks for Ruby, Node.js, Clojure, Python, Java, Gradle, Grails, Scala, Play, PHP and Go.

Buildpacks are automatically detected by Heroku in the above order, however, it can also be set manually through CLI using:

1. At the time of app creation

```
heroku create <app_name> --buildpack <buildpack_name>
```

2. Manually,

```
heroku buildpacks:set <buildpack_name>
```

---

Buildpack name can be specified either using shorthand or URL. Like for PHP buildpack,

```
heroku buildpacks:set heroku/php
```

or

```
heroku buildpacks:set https://elements.heroku.com/buildpacks/heroku/heroku-buildpack-php
```

### Multiple buildpacks

An application can also contain more than one buildpack. It can be achieved using `add`:

```
heroku buildpacks:add --index 1 <buildpack_name>
```

where, `--index` parameter specifies the execution order of buildpack.

Say,

```
heroku buildpacks:set heroku/php
heroku buildpacks:add --index 1 heroku/nodejs
```

will set the buildpack order as:

```
heroku/nodejs
heroku/php
```

**Remember:** A Heroku app has only one public port - 80. Hence either of the one will serve in one port. Say, if `procfile` is specified with `web: node server.js`, node application will run in port 80, otherwise PHP. However, the build will run in the order specified. If one needs more than one application, set up multiple projects and make it to communicate with each other.

Read Buildpack online: https://riptutorial.com/heroku/topic/6126/buildpack

# Chapter 3: Command Line

## Introduction

The Heroku Command Line Interface (CLI), formerly known as the Heroku Toolbelt, is a tool for creating and managing Heroku apps from the command line / shell of various operating systems.

## Syntax

- $ heroku --version
- $ heroku login
- $ heroku create

## Examples

### Download and install

# OS X

Download and run the OS X installer.

# Windows

Download and run the Windows installer 32-bit 64-bit.

# Debian/Ubuntu

Run the following to add our apt repository and install the CLI:

```
$ sudo add-apt-repository "deb https://cli-assets.heroku.com/branches/stable/apt ./"
$ curl -L https://cli-assets.heroku.com/apt/release.key | sudo apt-key add -
$ sudo apt-get update
$ sudo apt-get install heroku
```

# Standalone version

Download the tarball and extract it so that you can access the binary from your PATH. For example:

```
$ echo replace OS/ARCH with values as noted below
```

```
$ wget https://cli-assets.heroku.com/branches/stable/heroku-OS-ARCH.tar.gz
$ tar -xvzf heroku-OS-ARCH /usr/local/lib/heroku
$ ln -s /usr/local/lib/heroku/bin/heroku /usr/local/bin/heroku
```

# Verify your installation

To verify your CLI installation use the `heroku --version` command.

```
$ heroku --version
heroku-cli/5.6.0-010a227 (darwin-amd64) go1.7.4
```

## Getting started

You will be asked to enter your Heroku credentials the first time you run a command; after the first time, your email address and an API token will be saved to `~/.netrc` for future use.

It's generally a good idea to login and add your public key immediately after installing the Heroku CLI so that you can use git to push or clone Heroku app repositories:

```
$ heroku login
Enter your Heroku credentials.
Email: adam@example.com
Password (typing will be hidden):
Authentication successful.
```

You're now ready to create your first Heroku app:

```
$ cd ~/myapp
$ heroku create
Creating app... done, ⬢ sleepy-meadow-81798
https://sleepy-meadow-81798.herokuapp.com/ | https://git.heroku.com/sleepy-meadow-81798.git
```

Read Command Line online: https://riptutorial.com/heroku/topic/8324/command-line

# Chapter 4: Dependencies

## Syntax

- "dependencies": { ... }

## Examples

### Bower dependancy

To automatically install bower and its components, one must

1. Specify the bower dependency in `package.json`:

```
"dependencies": {
    "bower": "^1.7.9"
}
```

2. Use `scripts` to execute a `postinstall` command

```
"scripts": {
    "postinstall": "./node_modules/bower/bin/bower install"
}
```

3. Create a `.bowerrc` file to set the directory for bower_components to install. Otherwise bower_components are installed in root directory.

```
{
    "directory" : "app/bower_components"
}
```

Now, Heroku automatically executes `bower install` command after `npm install`

Read Dependencies online: https://riptutorial.com/heroku/topic/6665/dependencies

# Chapter 5: Deployment

## Syntax

- git push heroku master

## Examples

### Deploying with Git

# Tracking your app in git

Before you can push an app to Heroku, you'll need to initialize a local Git repository and commit your files to it. For example, if you have an app in a directory, myapp, then create a new repository for it:

```
$ cd myapp
$ git init
Initialized empty Git repository in .git/
$ git add .
$ git commit -m "my first commit"
Created initial commit 5df2d09: my first commit
 44 files changed, 8393 insertions(+), 0 deletions(-)
 create mode 100644 README
 create mode 100644 Procfile
 create mode 100644 app/controllers/source_file
...
```

This is a local repository, now residing inside the `.git` directory. Nothing has been sent anywhere yet; you'll need to create a remote and do a push to deploy your code to Heroku.

# Creating a Heroku remote

```
$ heroku create
Creating falling-wind-1624... done, stack is cedar-14
http://falling-wind-1624.herokuapp.com/ | https://git.heroku.com/falling-wind-1624.git
Git remote heroku added
```

Git repository with an existing application. The heroku git:remote command will add this remote for you based on your applications git url.

```
$ heroku git:remote -a falling-wind-1624
Git remote heroku added.
```

# Deploying code

you'll need to specify a remote branch to push to. You can do your first push:

```
$ git push heroku master
Initializing repository, done.
updating 'refs/heads/master'
...
```

To push a branch other than master, use this syntax:

```
$ git push heroku yourbranch:master
```

Read Deployment online: https://riptutorial.com/heroku/topic/8325/deployment

# Chapter 6: Heroku Add-ons

## Introduction

Details and how to use instructions about various Add-ons that are available with Heroku.

## Examples

### Heroku Scheduler

#### Installing Heroku Scheduler

```
heroku addons:create scheduler:standard
```

Read Heroku Add-ons online: https://riptutorial.com/heroku/topic/8906/heroku-add-ons

# Chapter 7: Heroku Error Codes

## Introduction

Whenever your app experiences an error, Heroku will return a standard error page with the HTTP status code 503. To help you debug the underlying error, however, the platform will also add custom error information to your logs. Each type of error gets its own error code, with all HTTP errors starting with the letter H and all runtime errors starting with R. Logging errors start with L.

## Syntax

- H10 - App crashed
- H11 - Backlog too deep
- H12 - Request timeout
- H13 - Connection closed without response
- H14 - No web dynos running
- H15 - Idle connection
- H16 - Redirect to herokuapp.com
- H17 - Poorly formatted HTTP response
- H18 - Server Request Interrupted
- H19 - Backend connection timeout
- H20 - App boot timeout
- H21 - Backend connection refused
- H22 - Connection limit reached
- H23 - Endpoint misconfigured
- H24 - Forced close
- H25 - HTTP Restriction
- H26 - Request Error
- H27 - Client Request Interrupted
- H28 - Client Connection Idle
- H80 - Maintenance mode
- H81 - Blank app
- H82 - Free dyno quota exhausted
- H99 - Platform error
- R10 - Boot timeout
- R12 - Exit timeout
- R13 - Attach error
- R14 - Memory quota exceeded
- R15 - Memory quota vastly exceeded
- R16 – Detached
- R17 - Checksum error
- R99 - Platform error
- L10 - Drain buffer overflow
- L11 - Tail buffer overflow

- L12 - Local buffer overflow
- L13 - Local delivery error
- L14 - Certificate validation error

# Examples

### H10 - App crashed

A crashed web dyno or a boot timeout on the web dyno will present this error.

```
2010-10-06T21:51:04-07:00 heroku[web.1]: State changed from down to starting
2010-10-06T21:51:07-07:00 app[web.1]: Starting process with command: `bundle exec rails server
-p 22020`
2010-10-06T21:51:09-07:00 app[web.1]: >> Using rails adapter
2010-10-06T21:51:09-07:00 app[web.1]: Missing the Rails 2.3.5 gem. Please `gem install -
v=2.3.5 rails`, update your RAILS_GEM_VERSION setting in config/environment.rb for the Rails
version you do have installed, or comment out RAILS_GEM_VERSION to use the latest version
installed.
2010-10-06T21:51:10-07:00 heroku[web.1]: Process exited
2010-10-06T21:51:12-07:00 heroku[router]: at=error code=H10 desc="App crashed" method=GET
path="/" host=myapp.herokuapp.com fwd=17.17.17.17 dyno= connect= service= status=503 bytes=
```

### H11 - Backlog too deep

When HTTP requests arrive faster than your application can process them, they can form a large backlog on a number of routers. When the backlog on a particular router passes a threshold, the router determines that your application isn't keeping up with its incoming request volume. You'll see an H11 error for each incoming request as long as the backlog is over this size. The exact value of this threshold may change depending on various factors, such as the number of dynos in your app, response time for individual requests, and your app's normal request volume.

```
2010-10-06T21:51:07-07:00 heroku[router]: at=error code=H11 desc="Backlog too deep" method=GET
path="/" host=myapp.herokuapp.com fwd=17.17.17.17 dyno= connect= service= status=503 bytes=
```

The solution is to increase your app's throughput by adding more dynos, tuning your database (for example, adding an index), or making the code itself faster. As always, increasing performance is highly application-specific and requires profiling.

### H12 - Request timeout

An HTTP request took longer than 30 seconds to complete. In the example below, a Rails app takes 37 seconds to render the page; the HTTP router returns a 503 prior to Rails completing its request cycle, but the Rails process continues and the completion message shows after the router message.

```
2010-10-06T21:51:07-07:00 app[web.2]: Processing PostController#list (for 75.36.147.245 at
2010-10-06 21:51:07) [GET]
2010-10-06T21:51:08-07:00 app[web.2]: Rendering template within layouts/application
2010-10-06T21:51:19-07:00 app[web.2]: Rendering post/list
```

```
2010-10-06T21:51:37-07:00 heroku[router]: at=error code=H12 desc="Request timeout" method=GET
path="/" host=myapp.herokuapp.com fwd=17.17.17.17 dyno=web.1 connect=6ms service=30001ms
status=503 bytes=0
2010-10-06T21:51:42-07:00 app[web.2]: Completed in 37000ms (View: 27, DB: 21) | 200 OK
[http://myapp.heroku.com/]
```

This 30-second limit is measured by the router, and includes all time spent in the dyno, including the kernel's incoming connection queue and the app itself.

### H13 - Connection closed without response

This error is thrown when a process in your web dyno accepts a connection, but then closes the socket without writing anything to it.

```
2010-10-06T21:51:37-07:00 heroku[router]: at=error code=H13 desc="Connection closed without
response" method=GET path="/" host=myapp.herokuapp.com fwd=17.17.17.17 dyno=web.1
connect=3030ms service=9767ms status=503 bytes=0
```

One example where this might happen is when a Unicorn web server is configured with a timeout shorter than 30s and a request has not been processed by a worker before the timeout happens. In this case, Unicorn closes the connection before any data is written, resulting in an H13.

### H14 - No web dynos running

This is most likely the result of scaling your web dynos down to 0 dynos. To fix it, scale your web dynos to 1 or more dynos:

```
$ heroku ps:scale web=1
```

Use the heroku ps command to determine the state of your web dynos.

```
2010-10-06T21:51:37-07:00 heroku[router]: at=error code=H14 desc="No web processes running"
method=GET path="/" host=myapp.herokuapp.com fwd=17.17.17.17 dyno= connect= service=
status=503 bytes=
```

### H15 - Idle connection

The dyno did not send a full response and was terminated due to 55 seconds of inactivity. For example, the response indicated a `Content-Length` of 50 bytes which were not sent in time.

```
2010-10-06T21:51:37-07:00 heroku[router]: at=error code=H15 desc="Idle connection" method=GET
path="/" host=myapp.herokuapp.com fwd=17.17.17.17 dyno=web.1 connect=1ms service=55449ms
status=503 bytes=18
```

Read Heroku Error Codes online: https://riptutorial.com/heroku/topic/8321/heroku-error-codes

# Chapter 8: Heroku Limits

## Examples

### List of all limitations in Heroku platform

**1. Logs:** By default, Heroku allows only 1500 lines of consolidated logs. When more than 1500 lines of logs are required, one has to use addons provided Heroku.

**2. Router:** HTTP request have 30s timeout for initial response and 55s timeout thereafter. Maximum of 1MB buffer allowed for response.

**3. Dynos:** Dyno *memory limits* based on the type chosen. For free dynos, sleep hours are imposed where it sleeps after 30 minutes of inactivity. In addition, verified accounts come with a monthly pool of 1000 Free dyno hours, and unverified accounts receive 550. An application can have upto 100 dynos and a *process type* can't be scaled to more than 10 dynos. Free dyno type can have a maximum of two concurrent running dynos.

**4. Config Vars:** Config key and value pair is limited to 32kb for an app.

**5. Build:** Users are limited to 75 requests to Heroku Git repos per hour, per app, per user. Uncompressed size during checkout can't reach more than 1GB. Slug size is limited to 300 MB and length of compilation can't exceed 15 minutes.

**6. Data Clips:** Every query can run to a maximum of 10 minutes and can return a maximum of 100,000 rows.

**7. Heroku Postgres:** Downtime varies with different tiers from less than 4 hours to 15 minutes per month.

**8. API Limits:** Maximum calls to Heroku API is restricted to 2400/hour.

**9. Membership Limits:** For an enterprise account, maximum of 500 members and for others, 25 members are allowed.

**10. Application count:** A maximum of 100 apps can be created by a verified user. Unverified users are restricted to 5 applications.

Read Heroku Limits online: https://riptutorial.com/heroku/topic/6190/heroku-limits

# Chapter 9: Heroku node.js Hello World

## Remarks

### login

`heroku login`

### create app

`heroku create` or `heroku create your_name`

### clone the example

```
git clone https://github.com/zoutepopcorn/herokuworld
cd herokuworld
```

### visit app in your browser

```
https://your_name.herokuapp.com/
```

**Optional** test it local:

```
heroku local web
```

check: lolhost:5000

So whats different to a normal node.js app? package.json

```
"scripts": {
  "start": "node index.js"
},
"engines": {
  "node": "7.6.0"
}
```

index.js

```
process.env.PORT
```

Local port: 5000. Heroku will map it to port 80 on your app url.

## Examples

### Heroku node.js hello world

#### index.js

```
var http = require("http");

http.createServer(function(request, response) {
  response.writeHead(200, {"Content-Type": "text/plain"});
  response.write("Heroku world!");
  response.end();
}).listen(process.env.PORT);
```

### package.json

```
{
  "name": "node-example",
  "version": "1.0.0",
  "description": "Hello world Heroku",
  "scripts": {
    "start": "node index.js"
  },

  "keywords": [
    "example",
    "heroku"
  ],
  "author": "Johan",
  "license": "MIT",
  "engines": {
    "node": "7.6.0"
  }
}
```

Read Heroku node.js Hello World online: https://riptutorial.com/heroku/topic/9897/heroku-node-js-hello-world

# Chapter 10: Heroku Postgres

## Examples

### How to Reset Postgres Database in Heroku

Steps to reset database in Heroku:

**1. Drop the database, when SHARED_DATABASE_URL is used:**

```
heroku pg:reset DATABASE
```

**2. Recreate the database with nothing in it:**

```
heroku run rake db:migrate
```

**3. Populate the database with your seed data:**

```
heroku run rake db:seed
```

**Steps 2 and 3 can be combined into one command by executing this:**

```
heroku run rake db:setup
```

### How to copy heroku database to local database

Steps to copy heroku database to local database:

**1. Run copy process in terminal:**

```
heroku pg:pull DATABASE_URL change_to_your_data_base_name --app change_to_your_app_name
```

**2. Change db owner using this query:**

```
GRANT ALL PRIVILEGES ON DATABASE change_to_your_data_base_name to change_to_your_user; ALTER
DATABASE change_to_your_data_base_name OWNER TO change_to_your_user;
```

**3. Generate and run query for all tables in you database:**

```
SELECT 'ALTER TABLE '|| schemaname || '.' || tablename ||' OWNER TO change_to_your_user;' FROM
pg_tables WHERE NOT schemaname IN ('pg_catalog', 'information_schema') ORDER BY schemaname,
tablename;
```

Read Heroku Postgres online: https://riptutorial.com/heroku/topic/6239/heroku-postgres

# Chapter 11: Logs

## Syntax

- $ heroku logs
- $ heroku logs -n 200
- $ heroku logs --tail
- $ heroku logs --dyno router
- $ heroku logs --source app
- $ heroku logs --source app --dyno worker
- $ heroku logs --source app --tail

## Examples

### Types of logs

Heroku aggregates three categories of logs for your app:

- **App logs** - Output from your application. This will include logs generated from within your application, application server and libraries. (Filter: `--source app`)
- **System logs** - Messages about actions taken by the Heroku platform infrastructure on behalf of your app, such as: restarting a crashed process, sleeping or waking a web dyno, or serving an error page due to a problem in your app. (Filter: `--source heroku`)
- **API logs** - Messages about administrative actions taken by you and other developers working on your app, such as: deploying new code, scaling the process formation, or toggling maintenance mode. (Filter: `--source heroku --dyno api`)

### Log format

Each log line is formatted as follows:

```
timestamp source[dyno]: message
```

- **Timestamp** - The date and time recorded at the time the log line was produced by the dyno or component. The timestamp is in the format specified by RFC5424, and includes microsecond precision.
- **Source** - All of your app's dynos (web dynos, background workers, cron) have the source, `app`. All of Heroku's system components (HTTP router, dyno manager) have the source, `heroku`.
- **Dyno** - The name of the dyno or component that wrote the log line. For example, worker #3 appears as `worker.3`, and the Heroku HTTP router appears as `router`.

- **Message** - The content of the log line. Lines generated by dynos that exceed 10000 bytes are split into 10000 byte chunks without extra trailing newlines. Each chunk is submitted as a separate log line.

### View logs

To fetch your logs, use the `heroku logs` command.

```
$ heroku logs
```

The logs command retrieves 100 log lines by default. You can specify the number of log lines to retrieve (up to a maximum of 1,500 lines) by using the `--num` (or `-n`) option.

```
$ heroku logs -n 200
```

## Real-time tail

Similar to `tail -f`, real-time tail displays recent logs and leaves the session open for real-time logs to stream in. By viewing a live stream of logs from your app, you can gain insight into the behavior of your live application and debug current problems. You can tail your logs using `--tail` (or `-t`).

```
$ heroku logs --tail
```

When you are done, press Ctrl+C to return to the prompt.

### Log Filtering

If you only want to fetch logs with a certain source, a certain dyno, or both, you can use the `--source` (or `-s`) and `--dyno` (or `-d`) filtering arguments:

```
$ heroku logs --dyno router
2012-02-07T09:43:06.123456+00:00 heroku[router]: at=info method=GET path="/stylesheets/dev-
center/library.css" host=devcenter.heroku.com fwd="204.204.204.204" dyno=web.5 connect=1ms
service=18ms status=200 bytes=13
2012-02-07T09:43:06.123456+00:00 heroku[router]: at=info method=GET path="/articles/bundler"
host=devcenter.heroku.com fwd="204.204.204.204" dyno=web.6 connect=1ms service=18ms status=200
bytes=20375

$ heroku logs --source app
2012-02-07T09:45:47.123456+00:00 app[web.1]: Rendered shared/_search.html.erb (1.0ms)
2012-02-07T09:45:47.123456+00:00 app[web.1]: Completed 200 OK in 83ms (Views: 48.7ms |
ActiveRecord: 32.2ms)
2012-02-07T09:45:47.123456+00:00 app[worker.1]: [Worker(host:465cf64e-61c8-46d3-b480-
362bfd4ecff9 pid:1)] 1 jobs processed at 23.0330 j/s, 0 failed ...
2012-02-07T09:46:01.123456+00:00 app[web.6]: Started GET "/articles/buildpacks" for 4.1.81.209
at 2012-02-07 09:46:01 +0000

$ heroku logs --source app --dyno worker
2012-02-07T09:47:59.123456+00:00 app[worker.1]: [Worker(host:260cf64e-61c8-46d3-b480-
362bfd4ecff9 pid:1)] Article#record_view_without_delay completed after 0.0221
```

```
2012-02-07T09:47:59.123456+00:00 app[worker.1]: [Worker(host:260cf64e-61c8-46d3-b480-
362bfd4ecff9 pid:1)] 5 jobs processed at 31.6842 j/s, 0 failed ...
```

You can also combine the filtering switches with `--tail` to get a real-time stream of filtered output.

```
$ heroku logs --source app --tail
```

Read Logs online: https://riptutorial.com/heroku/topic/8327/logs

# Chapter 12: Pipelines

## Syntax

- heroku pipelines:<install|create|promote>...

## Remarks

A pipeline is a group of Heroku apps that share the same codebase. Apps in a pipeline are grouped into “review”, “development”, “staging”, and “production” stages representing different deployment steps in a continuous delivery workflow.

## Examples

### Pipelines via the CLI

#### Installing pipeline

Once Heroku Toolbelt is installed it requires Pipelines plugin too.

```
heroku plugins:install heroku-pipelines
```

---

#### Creating pipelines

You must start with an app to add to the pipeline, although it doesn’t have to be for a particular stage. If you don’t specify `--stage STAGE`, the CLI will guess at the appropriate stage, but also let you override the default. The name of the pipeline will be guessed from the app name as well, but can be overridden either by adding the `NAME` on the command line, or entering a different name when prompted.

```
heroku pipelines:create -a example
```

---

#### Promoting

The target app(s) will be automatically determined by the downstream stage

```
heroku pipelines:promote -r staging
```

It is also possible to promote to a specific app (or set of apps)

```
heroku pipelines:promote -r staging --to my-production-app1,my-production-app2
```

---

### Help Command

A complete list of Pipelines commands with usage details is available in the console

```
heroku help pipelines
```

Read Pipelines online: https://riptutorial.com/heroku/topic/2389/pipelines

# Credits

| S. No | Chapters | Contributors |
|---|---|---|
| 1 | Getting started with heroku | Community, rdegges, thejonanshow |
| 2 | Buildpack | Thamilan |
| 3 | Command Line | Sender |
| 4 | Dependencies | Thamilan |
| 5 | Deployment | Sender |
| 6 | Heroku Add-ons | jophab |
| 7 | Heroku Error Codes | Sender |
| 8 | Heroku Limits | autoboxer, Thamilan |
| 9 | Heroku node.js Hello World | Johan Hoeksma |
| 10 | Heroku Postgres | Denis Savchuk, Hardik Kanjariya ツ, Thamilan |
| 11 | Logs | Sender |
| 12 | Pipelines | Thamilan |