Javalin

Javalin

https://javalin.io/

> Web Java Kotlin

```
import io.javalin.Javalin;

void main() {
    var app = Javalin.create(/*config*/)
        .get("/", ctx -> ctx.result("Hello World"))
        .start(7070);
}
```

```
import io.javalin.Javalin

fun main() {
    val app = Javalin.create(/*config*/)
        .get("/") { ctx -> ctx.result("Hello World") }
        .start(7070)
}
```

Javalin ?

-
  Java Kotlin Web Javalin

-
  Javalin Jetty Jetty

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  Java Kotlin Web Javalin Java Kotlin

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  Javalin Future,Javalin

- **OpenAPI**

  Java Kotlin Web OpenAPI, Javalin (Swagger UI ReDoc) OpenAPI

- **Jetty**

  Javalin Jetty Jetty JVM Web Jetty SSL HTTP3 Jetty

API

```
import io.javalin.Javalin;
import static io.javalin.apibuilder.ApiBuilder.*;

void main() {
    var app = Javalin.create(config -> {
        config.useVirtualThreads = true;
        config.http.asyncTimeout = 10_000L;
        config.staticFiles.add("/public");
        config.staticFiles.enableWebjars();
        config.router.apiBuilder(() -> {
            path("/users", () -> {
                get(UserController::getAll);
                post(UserController::create);
                path("/{userId}", () -> {
                    get(UserController::getOne);
                    patch(UserController::update);
                    delete(UserController::delete);
                });
                ws("/events", userController::webSocketEvents);
            });
        });
    }).start(7070);
}
```

Javalin

1Quick start

Javalin

https://javalin.io/documentation#getting-started

```
<dependency>
    <groupId>io.javalin</groupId>
    <artifactId>javalin</artifactId>
    <version>6.7.0</version>
</dependency>
```

Javalin Jackson Logback, id javalin-bundle Javalin

import io.javalin.Javalin;

void main() {
var app = Javalin.create(/*config*/)
.get(“/“, ctx -> ctx.result(“Hello World”))
.start(7070);
}

Javalin ()

beforegetpostputpatchdeleteafter (…headoptionstraceconnect)
//hello-world/hello/{name}
Handler ex ctx -> {…},MyClass Handler,
Handler void ctx.result (result)ctx.json (obj) ctx.future (future)

Handler,

—— Javalin

() pre-handler

before-handler
app.before(ctx -> {
// runs before all requests
});
app.before(“/path/*”, ctx -> {

```
// runs before request to /path/*
});
 before-handler ( 404) app.beforeMatched

app.beforeMatched(ctx -> {
// runs before all matched requests (including static files)
});

 API GET  POST Javalin  (GETPOSTPUTPATCHDELETEHEAD
OPTIONS),  Javalin#addHandler  (TRACECONNECT)



app.get(“/output”, ctx -> {
// some code
ctx.json(object);
});

app.post(“/input”, ctx -> {
// some code
ctx.status(201);
});
 path  ctx.pathParam (“key”)

app.get(“/hello/{name}”, ctx -> { // the {} syntax does not allow slashes (‘/‘) as part of the parameter
ctx.result(“Hello: “ + ctx.pathParam(“name”));
});
app.get(“/hello/“, ctx -> { // the <> syntax allows slashes (‘/‘) as part of the parameter
ctx.result(“Hello: “ + ctx.pathParam(“name”));
});


app.get(“/path/*”, ctx -> { // will match anything starting with /path/
ctx.result(“You are here because “ + ctx.path() + “ matches “ + ctx.matchedPath());
});
 path-parameter (                    {param-name})


 ()


app.after(ctx -> {
// run after all requests
});
app.after(“/path/*”, ctx -> {
// runs after request to /path/*
});
```

(404) app.afterMatched

```
app.afterMatched(ctx -> {
// runs after all matched requests (including static files)
});
```

Context http-request servlet-request servlet-response, getter setter

```
// Request methods
body() // request body as string
bodyAsBytes() // request body as array of bytes
bodyAsClass(clazz) // request body as specified class (deserialized from JSON)
bodyStreamAsClass(clazz) // request body as specified class (memory optimized version of above)
bodyValidator(clazz) // request body as validator typed as specified class
bodyInputStream() // the underyling input stream of the request
uploadedFile(“name”) // uploaded file by name
uploadedFiles(“name”) // all uploaded files by name
uploadedFiles() // all uploaded files as list
uploadedFileMap() // all uploaded files as a “names by files” map
formParam(“name”) // form parameter by name, as string
formParamAsClass(“name”, clazz) // form parameter by name, as validator typed as specified class
formParams(“name”) // list of form parameters by name
formParamMap() // map of all form parameters
pathParam(“name”) // path parameter by name as string
pathParamAsClass(“name”, clazz) // path parameter as validator typed as specified class
pathParamMap() // map of all path parameters
basicAuthCredentials() // basic auth credentials (or null if not set)
attribute(“name”, value) // set an attribute on the request
attribute(“name”) // get an attribute on the request
attributeOrCompute(“name”, ctx -> {}) // get an attribute or compute it based on the context if absent
attributeMap() // map of all attributes on the request
contentLength() // content length of the request body
contentType() // request content type
cookie(“name”) // request cookie by name
cookieMap() // map of all request cookies
header(“name”) // request header by name (can be used with Header.HEADERNAME)
headerAsClass(“name”, clazz) // request header by name, as validator typed as specified class
headerMap() // map of all request headers
host() // host as string
ip() // ip as string
isMultipart() // true if the request is multipart
isMultipartFormData() // true if the request is multipart/formdata
method() // request methods (GET, POST, etc)
path() // request path
port() // request port
protocol() // request protocol
```

queryParam(“name”) // query param by name as string
queryParamAsClass(“name”, clazz) // query param by name, as validator typed as specified class
queryParamsAsClass(“name”, clazz) // query param list by name, as validator typed as list of specified class
queryParams(“name”) // list of query parameters by name
queryParamMap() // map of all query parameters
queryString() // full query string
scheme() // request scheme
sessionAttribute(“name”, value) // set a session attribute
sessionAttribute(“name”) // get a session attribute
consumeSessionAttribute(“name”) // get a session attribute, and set value to null
cachedSessionAttribute(“name”, value) // set a session attribute, and cache the value as a request attribute
cachedSessionAttribute(“name”) // get a session attribute, and cache the value as a request attribute
cachedSessionAttributeOrCompute(…) // same as above, but compute and set if value is absent
sessionAttributeMap() // map of all session attributes
url() // request url
fullUrl() // request url + query string
contextPath() // request context path
userAgent() // request user agent
req() // get the underlying HttpServletRequest

// Response methods
result(“result”) // set result stream to specified string (overwrites any previously set result)
result(byteArray) // set result stream to specified byte array (overwrites any previously set result)
result(inputStream) // set result stream to specified input stream (overwrites any previously set result)
future(futureSupplier) // set the result to be a future, see async section (overwrites any previously set result)
writeSeekableStream(inputStream) // write content immediately as seekable stream (useful for audio and video)
result() // get current result stream as string (if possible), and reset result stream
resultInputStream() // get current result stream
contentType(“type”) // set the response content type
header(“name”, “value”) // set response header by name (can be used with Header.HEADERNAME)
redirect(“/path”, code) // redirect to the given path with the given status code
status(code) // set the response status code
status() // get the response status code
cookie(“name”, “value”, maxAge) // set response cookie by name, with value and max-age (optional).
cookie(cookie) // set cookie using javalin Cookie class
removeCookie(“name”, “/path”) // removes cookie by name and path (optional)
json(obj) // calls result(jsonString), and also sets content type to json
jsonStream(obj) // calls result(jsonStream), and also sets content type to json
html(“html”) // calls result(string), and also sets content type to html
render(“/template.tmpl”, model) // calls html(renderedTemplate)
res() // get the underlying HttpServletResponse

// Other methods
async(runnable) // lifts request out of Jetty’s ThreadPool, and moves it to Javalin’s AsyncThreadPool
async(asyncConfig, runnable) // same as above, but with additonal config
handlerType() // handler type of the current handler (BEFORE, AFTER, GET, etc)
appData(typedKey) // get data from the Javalin instance (see app data section below)
with(pluginClass) // get context plugin by class, see plugin section below
matchedPath() // get the path that was used to match this request (ex, “/hello/{name}”)
endpointHandlerPath() // get the path of the endpoint handler that was used to match this request
cookieStore() // see cookie store section below
skipRemainingHandlers() // skip all remaining handlers for this request

Javalin#create Javalin Context appData (…) Javalin

// register a custom attribute
var myKey = new Key(“my-key”);
var app = Javalin.create(config -> {
config.appData(myKey, myValue);
});
// access a custom attribute
var myValue = ctx.appData(myKey); // var will be inferred to MyValue
// call a custom method on a custom attribute
ctx.appData(myKey).myMethod();

Cookie Store
CookieStore

ctx.cookieStore().set(key, value); // store any type of value
ctx.cookieStore().get(key); // read any type of value
ctx.cookieStore().clear(); // clear the cookie-store
CookieStore

cookie () cookie-store-map
ctx.attribute ()
cookie-store-map base64 cookie map ()

serverOneApp.post(“/cookie-storer”, ctx -> {
ctx.cookieStore().set(“string”, “Hello world!”);
ctx.cookieStore().set(“i”, 42);
ctx.cookieStore().set(“list”, Arrays.asList(“One”, “Two”, “Three”));
});
serverTwoApp.get(“/cookie-reader”, ctx -> { // runs on a different server than serverOneApp
String string = ctx.cookieStore().get(“string”)
int i = ctx.cookieStore().get(“i”)
List list = ctx.cookieStore().get(“list”)
});
cookie, serverTwoApp get serverOneApp

cookie 4kb

WebSocket
Javalin WebSocket Lambda

```
app.ws(“/websocket/{path}”, ws -> {
ws.onConnect(ctx -> System.out.println(“Connected”));
});
```

```
ws.onConnect(WsConnectContext)
ws.onError(WsErrorContext)
ws.onClose(WsCloseContext)
ws.onMessage(WsMessageContext)
ws.onBinaryMessage(WsBinaryMessageContext)
```

WsContext WsMessageContext .message () WsContext

—— Javalin WebSocket

WsBefore
App.wsBefore WebSocket WebSocket

```
app.wsBefore(ws -> {
// runs before all WebSocket requests
});
app.wsBefore(“/path/*”, ws -> {
// runs before websocket requests to /path/*
});
```

WsEndpoint
 app.wsBefore (pathhandler) WebSocket WebSocket

```
app.ws(“/websocket/{path}”, ws -> {
ws.onConnect(ctx -> System.out.println(“Connected”));
ws.onMessage(ctx -> {
User user = ctx.messageAsClass(User.class); // convert from json
ctx.send(user); // convert to json and send back
});
ws.onBinaryMessage(ctx -> System.out.println(“Message”))
ws.onClose(ctx -> System.out.println(“Closed”));
ws.onError(ctx -> System.out.println(“Errored”));
});
```

WsAfter
App.wsAfter WebSocket WebSocket

```
app.wsAfter(ws -> {
// runs after all WebSocket requests
});
app.wsAfter(“/path/*”, ws -> {
```

// runs after websocket requests to /path/*
});
WsContext
WsContext websocket websocket servlet

// Session methods
send(obj) // serialize object to json string and send it to client
send(“message”) // send string to client
send(byteBuffer) // send bytes to client
sendAsClass(obj, clazz) // serialize object to json string and send it to client

// Upgrade Context methods (getters)
matchedPath() // get the path that was used to match this request (ex, “/hello/{name}”)
host() // host as string

queryParam(“name”) // query param by name as string
queryParamAsClass(“name”, clazz) // query param parameter by name, as validator typed as specified class
queryParams(“name”) // list of query parameters by name
queryParamMap() // map of all query parameters
queryString() // full query string

pathParam(“name”) // path parameter by name as string
pathParamAsClass(“name”, clazz) // path parameter as validator typed as specified class
pathParamMap() // map of all path parameters

header(“name”) // request header by name (can be used with Header.HEADERNAME)
headerAsClass(“name”, clazz) // request header by name, as validator typed as specified class
headerMap() // map of all request headers

cookie(“name”) // request cookie by name
cookieMap() // map of all request cookies

attribute(“name”, value) // set an attribute on the request
attribute(“name”) // get an attribute on the request
attributeMap() // map of all attributes on the request

sessionAttribute(“name”) // get a session attribute
sessionAttributeMap() // map of all session attributes

sendPing() // send a ping to the client
sendPing(bytes) // send a ping with data to the client
enableAutomaticPings() // enable automatic pinging to avoid timeouts
enableAutomaticPings(1, HOURS, bytes) // enable automatic pinging with custom interval and/or data
disableAutomaticPings() // disable automatic pinging

closeSession() // close the session

closeSession(closeStatus) // close the session with a CloseStatus
closeSession(400, “reason”) // close the session with a status and reason
WsMessageContext
message() // receive a string message from the client
messageAsClass(clazz) // deserialize message from client
WsBinaryMessageContext
data() // receive a byte array of data from the client
offset() // the offset of the data
length() // the length of the data
WsCloseContext
status() // the int status for why connection was closed
reason() // the string reason for why connection was closed
WsErrorContext
error() // the throwable error that occurred
WsConnectContext
WsConnectContext WsContext

apiBuilder () path () apiBuilder () Javalin app. router. ApiBuilder.get (app/router,…), app/router.get (…)

import static io.javalin.apiBuilder.ApiBuilder.* HTTP

```
config.router.apiBuilder(() -> {
path(“/users”, () -> {
get(UserController::getAllUsers);
post(UserController::createUser);
path(“/{id}”, () -> {
get(UserController::getUser);
patch(UserController::updateUser);
delete(UserController::deleteUser);
});
ws(“/events”, UserController::webSocketEvents);
});
});
```

()……

CrudHandler
CrudHandler apiBuilder ()

```
config.router.apiBuilder(() -> {
crud(“users/{user-id}”, new UserController());
});
```

```
interface CrudHandler {
getAll(ctx)
```

getOne(ctx, resourceId)
create(ctx)
update(ctx, resourceId)
delete(ctx, resourceId)
}

Javalin Validator

ctx.queryParamAsClass(“paramName”, MyClass.class) // creates a Validator for the value of queryParam(“paramName”)
ctx.formParamAsClass(“paramName”, MyClass.class) // creates a Validator for the value of formParam(“paramName”)
ctx.pathParamAsClass(“paramName”, MyClass.class) // creates a Validator for the value of pathParam(“paramName”)
ctx.headerAsClass(“headerName”, MyClass.class) // creates a Validator for the value of header(“paramName”)
ctx.bodyValidator(MyClass.class) // creates a Validator for the value of body()
Validator.create (clazzvaluefieldName)

API
allowNullable() // turn the Validator into a NullableValidator (must be called first)
check(predicate, “error”) // add a check with a ValidationError(“error”) to the Validator
check(predicate, validationError) // add a check with a ValidationError to the Validator (can have args for localization)
get() // return the validated value as the specified type, or throw ValidationException
getOrThrow(exceptionFunction) // return the validated value as the specified type, or throw custom exception
getOrDefault() // return default-value if value is null, else call get()
errors() // get all the errors of the Validator (as map(“fieldName”, List))

// VALIDATE A SINGLE QUERY PARAMETER WITH A DEFAULT VALUE
//
Integer myValue = ctx.queryParamAsClass(“value”, Integer.class).getOrDefault(788) // validate value
ctx.result(value) // return validated value to the client
// GET ?value=a would yield HTTP 400 - {“my-qp”:
[{“message”:”TYPE_CONVERSION_FAILED”,”args”:{},”value”:”a”}]}
// GET ?value=1 would yield HTTP 200 - 1 (the validated value)
// GET ? would yield HTTP 200 - 788 (the default value)

// VALIDATE TWO DEPENDENT QUERY PARAMETERS //
Instant fromDate = ctx.queryParamAsClass(“from”, Instant.class).get();
Instant toDate = ctx.queryParamAsClass(“to”, Instant.class)
.check(it -> it.isAfter(fromDate), “‘to’ has to be after ‘from’”)
.get();

// VALIDATE A JSON BODY //
MyObject myObject = ctx.bodyValidator(MyObject.class)

```
.check(obj -> obj.myObjectProperty == someValue, “THINGS_MUST_BE_EQUAL”)
.get();

// VALIDATE WITH CUSTOM VALIDATIONERROR ////////////////////////////////////////////////////////////////
ctx.queryParamAsClass(“param”, Integer.class)
.check({ it > 5 }, new ValidationError(“OVER_LIMIT”, Map.of(“limit”, 5)))
.get();
// GET ?param=10 would yield HTTP 400 - {“param”:[{“message”:”OVER_LIMIT”,”args”:
{“limit”:5},”value”:10}]}

Validator ageValidator = ctx.queryParamAsClass(“age”, Integer.class)
.check(n -> !n.contains(“-“), “ILLEGAL_CHARACTER”)

// Empty map if no errors, otherwise a map with the key “age” and failed check messages in the list.
Map<String, List> errors = ageValidator.errors();

// Merges all errors from all validators in the list. Empty map if no errors exist.
Map<String, List> manyErrors = JavalinValidation.collectErrors(ageValidator, otherValidator, …)
ValidationException


app.exception(ValidationException::class.java) { e, ctx ->
ctx.json(e.errors).status(400)
}


app.exception(ValidationException.class, (e, ctx) -> {
// your code
});



Javalin.create(config -> {
config.validation.register(Instant.class, v -> Instant.ofEpochMilli(Long.parseLong(v)));
});

Javalin  AccessManager  /  Javalin 6  preMatched  Javalin 5  6

 Javalin 6

app.beforeMatched(ctx -> {
var userRole = getUserRole(ctx); // some user defined function that returns a user role
if (!ctx.routeRoles().contains(userRole)) { // routeRoles are provided through the Context interface
throw new UnauthorizedResponse(); // request will have to be explicitly stopped by throwing an
exception
}
});
```

app.get(“/public”, ctx -> ctx.result(“Hello public”), Role.OPEN);
app.get(“/private”, ctx -> ctx.result(“Hello private”), Role.LOGGED_IN);

Javalin HttpResponseException JSON, JSON

app.post(“/“) { throw new ForbiddenResponse(“Off limits!”) }
 JSON:

{
“title”: “Off limits!”,
“status”: 403,
“type”: “https://javalin.io/documentation#forbiddenresponse",
“details”: []
}

Forbidden
 Map<StringString>

RedirectResponse
 Redirected 302 Found

BadRequestResponse
 400 Bad Request Bad Request

UnauthorizedResponse
 401 Unauthorized

ForbiddenResponse
 403 Forbidden

NotFoundResponse
 404 Not Found Not Found

MethodNotAllowedResponse
 405 MethodNotAllowed Method not allowed

ConflictResponse
 409 Conflict Conflict

GoneResponse
 410 Gone Gone

InternalServerErrorResponse
 “” 500

Bad GatewayResponse
 Bad Gateway 502 Bad Gateway

Service UnavailableResponse
“Service Unavailable” 503 Service Unavailable

GatewayTimeoutResponse
504 Gateway Timeout Gateway Timeout

(preendafterws) Exception (Exception)app.exception () app.wsException ()

```
// HTTP exceptions
app.exception(NullPointerException.class, (e, ctx) -> {
// handle nullpointers here
});

app.exception(Exception.class, (e, ctx) -> {
// handle general exceptions here
// will not trigger if more specific exception-mapper found
});

// WebSocket exceptions
app.wsException(NullPointerException.class, (e, ctx) -> {
// handle nullpointers here
});

app.wsException(Exception.class, (e, ctx) -> {
// handle general exceptions here
// will not trigger if more specific exception-mapper found
});
```

HTTP Error Exception HTTP Exception

```
app.error(404, ctx -> {
ctx.result(“Generic 404 message”);
});


app.exception(FileNotFoundException.class, (e, ctx) -> {
ctx.status(404);
}).error(404, ctx -> {
ctx.result(“Generic 404 message”);
});


app.error(404, “html”, ctx -> {
ctx.html(“Generic 404 message”);
});
```

HTML JSON

Javalin () app.sse (), SSEClient:

```
app.sse(“/sse”, client -> {
client.sendEvent(“connected”, “Hello, SSE”);
client.onClose(() -> System.out.println(“Client disconnected”));
client.close(); // close the client
});
```

client.keepAlive ():

```
Queue clients = new ConcurrentLinkedQueue();

app.sse(“/sse”, client -> {
client.keepAlive();
client.onClose(() - > clients.remove(client));
clients.add(client);
});
```

SeseClient API

```
sendEvent(“myMessage”) // calls emit(“message”, “myMessage”, noId)
sendEvent(“eventName”, “myMessage”) // calls emit(“eventName”, “myMessage”, noId)
sendEvent(“eventName”, “myMessage”, “id”) // calls emit(“eventName”, “myMessage”, “id”)
sendComment(“myComment”) // calls emit(“myComment”)
onClose(runnable) // callback which runs when a client closes its connection
keepAlive() // keeps the connection alive. useful if you want to keep a list of clients to broadcast to.
close() // closes the connection
terminated() // returns true if the connection has been closed
ctx // the Context from when the client connected (to fetch query-params, etc)
```

Javalin config Javalin subconfig

```
Javalin.create(config -> {
config.http // The http layer configuration: etags, request size, timeout, etc
config.router // The routing configuration: context path, slash treatment, etc
config.jetty // The embedded Jetty webserver configuration
config.staticFiles // Static files and webjars configuration
config.spaRoot = // Single Page Application roots configuration
config.requestLogger // Request Logger configuration: http and websocket loggers
config.bundledPlugins // Bundled plugins configuration: enable bundled plugins or add custom ones
config.events // Events configuration
config.vue // Vue Plugin configuration
config.contextResolver // Context resolver implementation configuration
config.validation // Default validator configuration
config.useVirtualThreads // Use virtual threads (based on Java Project Loom)
config.showJavalinBanner // Show the Javalin banner in the logs
config.startupWatcherEnabled // Print warning if instance was not started after 5 seconds
config.pvt // This is “private”, only use it if you know what you’re doing
```

```
 config.events(listenerConfig) // Add an event listener
config.jsonMapper(jsonMapper) // Set a custom JsonMapper
config.fileRenderer(fileRenderer) // Set a custom FileRenderer
config.registerPlugin(plugin) // Register a plugin
config.appData(key, data) // Store data on the Javalin instance
```

});

HttpConfig
Javalin.create(config -> {
config.http.generateEtags = booleanValue; // if javalin should generate etags for dynamic responses (not static files)
config.http.prefer405over404 = booleanValue; // return 405 instead of 404 if path is mapped to different HTTP method
config.http.maxRequestSize = longValue; // the max size of request body that can be accessed without using using an InputStream
config.http.responseBufferSize = longValue; // the size of the response buffer (default 32kb)
config.http.defaultContentType = stringValue; // the default content type
config.http.asyncTimeout = longValue; // timeout in milliseconds for async requests (0 means no timeout)
config.http.strictContentTypes = booleanValue; // throw exception if e.g content-type is missing/incorrect when attempting to parse JSON

```
 config.http.customCompression(strategy);        // set a custom compres
sion strategy
config.http.brotliAndGzipCompression(lvl, lvl); // enable brotli and gzi
p compression with the specified levels
config.http.gzipOnlyCompression(lvl);           // enable gzip compressi
on with the specified level
config.http.brotliOnlyCompression(lvl);         // enable brotli compres
sion with the specified level
config.http.disableCompression();               // disable compression
```

});
ContextResolvers
Context ContextResolvers

Javalin.create(config -> {
config.contextResolver.ip = ctx -> “custom ip”; // called by Context#ip()
config.contextResolver.host = ctx -> “custom host”; // called by Context#host()
config.contextResolver.scheme = ctx -> “custom scheme”; // called by Context#scheme()
config.contextResolver.url = ctx -> “custom url”; // called by Context#url()
config.contextResolver.fullUrl = ctx -> “custom fullUrl”; // called by Context#fullUrl()
});
JettyConfig

```
Javalin.create(config -> {
config.jetty.defaultHost = “localhost”; // set the default host for Jetty
config.jetty.defaultPort = 1234; // set the default port for Jetty
config.jetty.threadPool = new ThreadPool(); // set the thread pool for Jetty
config.jetty.timeoutStatus = 408; // set the timeout status for Jetty (default 500)
config.jetty.clientAbortStatus = 499; // set the abort status for Jetty (default 500)
config.jetty.multipartConfig = new MultipartConfig(); // set the multipart config for Jetty
config.jetty.modifyJettyWebSocketServletFactory(factory -> {}); // modify the
JettyWebSocketServletFactory
config.jetty.modifyServer(server -> {}); // modify the Jetty Server
config.jetty.modifyServletContextHandler(handler -> {}); // modify the ServletContextHandler (you can
set a SessionHandler here)
config.jetty.modifyHttpConfiguration(httpConfig -> {}); // modify the HttpConfiguration
config.jetty.addConnector((server, httpConfig) -> new ServerConnector(server)); // add a connector to
the Jetty Server
});
```

MultipartConfig

Ctrl+f FileUploadConfig

Javalin servlet

```
Javalin.create(config -> {
config.jetty.multipartConfig.cacheDirectory(“c:/temp”); //where to write files that exceed the in memory
limit
config.jetty.multipartConfig.maxFileSize(100, SizeUnit.MB); //the maximum individual file size allowed
config.jetty.multipartConfig.maxInMemoryFileSize(10, SizeUnit.MB); //the maximum file size to handle
in memory
config.jetty.multipartConfig.maxTotalRequestSize(1, SizeUnit.GB); //the maximum size of the entire
multipart request
});
```

RequestLoggerConfig

config.requestLogger.http () HTTP ():

```
Javalin.create(config -> {
config.requestLogger.http((ctx, ms) -> {
// log things here
});
});
```

config.requestLogger.ws () WebSocket app.ws () onMessage,
onConnectonError onClose

```
Javalin.create(config -> {
config.requestLogger.ws(ws -> {
ws.onMessage(ctx -> {
System.out.println(“Received: “ + ctx.message());
});
```

});
});
WebSocket

RouterConfig
Javalin.create(config -> {
config.router.contextPath = stringValue; // the context path (ex '/blog' if you are hosting an app on a subpath, like 'mydomain.com/blog')
config.router.ignoreTrailingSlashes = booleanValue; // treat '/path' and '/path/' as the same path
config.router.treatMultipleSlashesAsSingleSlash = booleanValue; // treat '/path//subpath' and '/path/subpath' as the same path
config.router.caseInsensitiveRoutes = booleanValue; // treat '/PATH' and '/path' as the same path
});
SpaRootConfig
(SPA) 404 404

config.spaRoot.addFile ("/root""/path/to/file.html") / config.spaRoot.addFile ("/root""/path/to/file.html"Location.EXTERNAL)

Handler ():

config.spaRoot.addHandler("/root", ctx -> {
ctx.html(…);
});
StaticFileConfig
config.staticFiles.add ("/directorylocation") GET

run before-handlers
run endpoint-handlers
if no endpoint-handler found
run static-file-handlers
if static-file-found
static-file-handler sends response
else
response is 404
run after-handlers
Javalin StaticFileConfig

Javalin.create(config -> {
config.staticFiles.add(staticFiles -> {
staticFiles.hostedPath = "/"; // change to host files on a subpath, like '/assets'
staticFiles.directory = "/public"; // the directory where your files are located
staticFiles.location = Location.CLASSPATH; // Location.CLASSPATH (jar) or Location.EXTERNAL (file system)
staticFiles.precompress = false; // if the files should be pre-compressed and cached in memory (optimization)

staticFiles.aliasCheck = null; // you can configure this to enable symlinks (=
ContextHandler.ApproveAliases())
staticFiles.headers = Map.of(…); // headers that will be set for the files
staticFiles.skipFileFunction = req -> false; // you can use this to skip certain files in the dir, based on the HttpServletRequest
staticFiles.mimeTypes.add(mimeType, ext); // you can add custom mimetypes for extensions
});
});
config.staticFiles.add (…)

Webjars config.staticFiles.enableWebjars () /webjars/name/version/file.ext Webjars
https://www.webjars.org/ NPM Webjars

(SPA), SpaRootConfig

Javalin Java

org.slf4j slf4j-simple 2.0.17 Javalin Jetty start () stop:
Javalin app = Javalin.create()
.start() // start server (sync/blocking)
.stop() // stop server (sync/blocking)
App.start () app.stop ()

Runtime.getRuntime().addShutdownHook(new Thread(() -> {
app.stop();
}));

app.events(event -> {
event.serverStopping(() -> { /* Your code here */ });
event.serverStopped(() -> { / Your code here */ });
});
modifyServer

Javalin.create(config -> {
config.jetty.modifyServer(server -> server.setStopTimeout(5_000)); // wait 5 seconds for existing requests to finish
});

Javalin#start Host (IP)

Javalin.create().start(“127.0.0.1”, 1235)
SessionHandler

jetty
() Jetty Javalin

```
StatisticsHandler statisticsHandler = new StatisticsHandler();

Javalin.create(config -> {
config.server(() -> {
Server server = new Server();
server.setHandler(statisticsHandler);
return server;
})
});
```

SSL/HTTP2
Javalin SSL https://javalin.io/plugins/ssl-helpers SSL HTTP2/3, Jetty

Jetty SSL HTTP2,

HelloWorldSecure SSL

HTTP2 Kotlin Java javalin-http2-example

Javalin /

```
Javalin app = Javalin.create().events(event -> {
event.serverStarting(() -> { … });
event.serverStarted(() -> { … });
event.serverStartFailed(() -> { … });
event.serverStopping(() -> { … });
event.serverStopped(() -> { … });
event.handlerAdded(handlerMetaInfo -> { … });
event.wsHandlerAdded(wsHandlerMetaInfo -> { … });
});

app.start() // serverStarting -> (serverStarted || serverStartFailed)
app.stop() // serverStopping -> serverStopped
```

Javalin Plugin Javalin

Javalin

```
Javalin#before // runs first, can throw exception (which will skip any endpoint handlers)
Javalin#get/post/patch/etc // runs second, can throw exception
```

Javalin#error // runs third, can throw exception
Javalin#after // runs fourth, can throw exception
Javalin#exception // runs any time a handler throws (cannot throw exception)
JavalinConfig#requestLogger // runs after response is written to client
JavalinConfig#accessManager // wraps all your endpoint handlers in a lambda of your choice

Javalin Handler

app.get("/", ctx -> {
NaiveRateLimit.requestPerTimeUnit(ctx, 5, TimeUnit.MINUTES); // throws if rate limit is exceeded
ctx.status("Hello, rate-limited World!");
});

// you can overwrite the key-function:
RateLimitUtil.keyFunction = ctx -> // uses (ip+method+endpointPath) by default

Android
Jetty 11 Android , Javalin 5 + Javalin 4 Javalin 4 Android Jetty 11 +
.

JRE Looom,Javalin VirtualThreadPerTaskExecutor enableVirtualThreads
250 QueuedThreadPool

Handler Javalin 250 (1)

Loomylin Looom Javalin

ctx.future () ctx.async ()

Jetty

WebSocket
WebSocket TCP Javalin WebSocket

WebSocket

Javalin Javalin /tutorials/testing (/ UI /)

Javadoc
Javadoc.io Javadoc Javadoc

Javalin, jar, java -jar filename.jar jarJavalin

Javalin

Heroku ()
AWS/Lambda ()
Web
Ctrl+f:“ jetty”“tomcat”“standalone”“servlet container”“war”
Javalin Jetty Web (Tomcat) Javalin, Maven Gradle Jetty, Javalin
servlet

ctx.uploadedFiles ()

```
app.post(“/upload”, ctx -> {
ctx.uploadedFiles(“files”).forEach(uploadedFile ->
FileUtil.streamToFile(uploadedFile.content(), “upload/“ + uploadedFile.filename()));
});
```

HTML

Ctrl+f CompletableFutureFutureConcurrentConcurrency ThreadPool (250)
Javalin Supplier ctx.future () Javalin
Future
API, API, CompletableFuture , Java HttpClient

```
private static CompletableFuture<HttpResponse> getRandomCatFactFuture() {
HttpRequest request = HttpRequest.newBuilder()
.uri(URI.create(“https://catfact.ninja/fact"))
.build();
return httpClient.sendAsync(request, ofString());
}
```

Javalin cat fact:

```
app.get(“/cat-facts”, ctx -> {
ctx.future(() -> {
return getRandomCatFactFuture()
.thenAccept(response -> ctx.html(response.body()).status(response.statusCode()))
.exceptionally(throwable -> {
ctx.status(500).result(“Could not get cat facts” + throwable.getMessage());
return null;
})
});
});
```

ctx.future (supplier), Javalin setter Javalin supplier,

Ctx.future () CompletableFuture API (Java HttpClient) CompletableFuture,
ctx.async (runnable) ()

ThreadPool ctx.async ()

async(runnableTask) // Javalin’s default executor, no timeout or timeout callback
async(timeout, onTimeout, runnableTask) // Javalin’s default executor, custom timeout handling
async(executor, timeout, onTimeout, runnableTask) // custom everything!
Javalin ()

app.get(“/async”, ctx -> {
ctx.async(
1000, // timeout in ms
() -> ctx.result(“Request took too long”), // timeout callback
() -> ctx.result(someSlowResult) // some long running task
);
});
JSONMapper
JsonMapper, config.jsonMapper () JsonMapper

JsonMapper

String toJsonString(Object obj, Type type) { // basic method for mapping to json
InputStream toJsonStream(Object obj, Type type) { // more memory efficient method for mapping to json
writeToOutputStream(Stream<*> stream, OutputStream outputStream) { // most memory efficient method for mapping to json
T fromJsonString(String json, Type targetType) { // basic method for mapping from json
T fromJsonStream(InputStream json, Type targetType) { // more memory efficient method for mapping from json
JSON (Jackson)
Javalin Jackson JSON

com.fasterxml.jackson.module.kotlin.KotlinModule // Kotlin support
com.fasterxml.jackson.datatype.jsr310.JavaTimeModule // Java date/time support
org.ktorm.jackson.KtormModule // Ktorm support
com.fasterxml.jackson.datatype.eclipsecollections.EclipseCollectionsModule // Eclipse Collections support

config.jsonMapper(new JavalinJackson().updateMapper(mapper -> {
mapper.setSerializationInclusion(JsonInclude.Include.NON_NULL);
});
GSON
Gson gson = new GsonBuilder().create();
JsonMapper gsonMapper = new JsonMapper() {
@Override

public String toJsonString(@NotNull Object obj, @NotNull Type type) {
return gson.toJson(obj, type);
}

```
 @Override
public <T> T fromJsonString(@NotNull String json, @NotNull Type targetTy
pe) {
    return gson.fromJson(json, targetType);
}
```

};
Javalin app = Javalin.create(config -> config.jsonMapper(gsonMapper)).start(7070);
Javalin Servlet Filter
Javalin Jetty Server Servlet Filter Servlet,repo
/src/test/java/io/javalin/examples/HelloWorldServlet.java#L21-L29

Jetty AsyncProxyServlet:

// Add org.eclipse.jetty:jetty-proxy to maven/gradle dependencies (e.g Javalin 5.3.2 uses Jetty 11.0.13)
Javalin.create(config -> {
config.jetty.modifyServletContextHandler(handler -> {
ServletHolder proxyServlet = new ServletHolder(AsyncProxyServlet.Transparent.class);
proxyServlet.setInitParameter(“proxyTo”, “https://javalin.io/");
proxyServlet.setInitParameter(“prefix”, “/proxy”);
handler.addServlet(proxyServlet, “/proxy/*”);
});
}).start(7000);
http://localhost:7000/proxy/ Javalin ()

Javalin FileRendererFileRenderer

String render(String filePath, Map<String, Object> model, Context context)
Context#render Javalin.create ()

config.fileRenderer((filePath, model, context) -> “Rendered template”);
Javalin FileRenderer JavalinRenderer

Javalin javalin-rendering, javalin /plugins/rendering

Vue (JavalinVue)
NPM Javalin Vue.js src/main/resources/vue/layout.html:

@componentRegistration
@routeComponent

.vue src/main/resources/vue Javalin
Javalin Vue path

Vue VueComponent
get(“/messages”, VueComponent(“inbox-view”))
get(“/messages/{user}”, VueComponent(“thread-view”))

/plugins/javalinvue /tutorials/simple-frontends-with-javalin-and-vue

Jetty
DEBUG TimeoutException ClosedChannelException, HTTP
idleTimeout Jetty/Javalin 30 bug

Java
Javalin java.lang.Error 500

```
Javalin.create( cfg -> {
cfg.pvt.javaLangErrorHandler((res, error) -> {
res.setStatus(HttpStatus.INTERNAL_SERVER_ERROR.getCode());
JavalinLogger.error(“Exception occurred while servicing http-request”, error);
});
});
```

Ctrl+f BukkitSpigotBungee CordBungee CordWaterfallWaterfallPaper
Javalin, Jetty WebSocket

Javalin Minecraft Minecraft

relocate Javalin Minecraft Server

jetty shadow-jar gradle build.gradle

```
shadowJar {
relocate ‘org.eclipse.jetty’, ‘shadow.org.eclipse.jetty’
}
```

java.lang.NoClassDefFoundError java.lang.ClassNotFoundException,

```
ClassLoader classLoader = Thread.currentThread().getContextClassLoader();
Thread.currentThread().setContextClassLoader(RemoteAPI.class.getClassLoader());
Javalin app = Javalin.create().start(PORT);
Thread.currentThread().setContextClassLoader(classLoader);
```

RemoteAPI Bukkit Spigot org.bukkit.plugin.java#JavaPlugin BungeeCord
WaterFall net.md_5.bungee.api.plugin#Plugin {} class.getClassLoader ()

Javalin Javalin

Https://github.com/javalin/javalin/issues/358 ()
Https://github.com/javalin/javalin/issues/232
Https://github.com/javalin/javalin/issues/1462

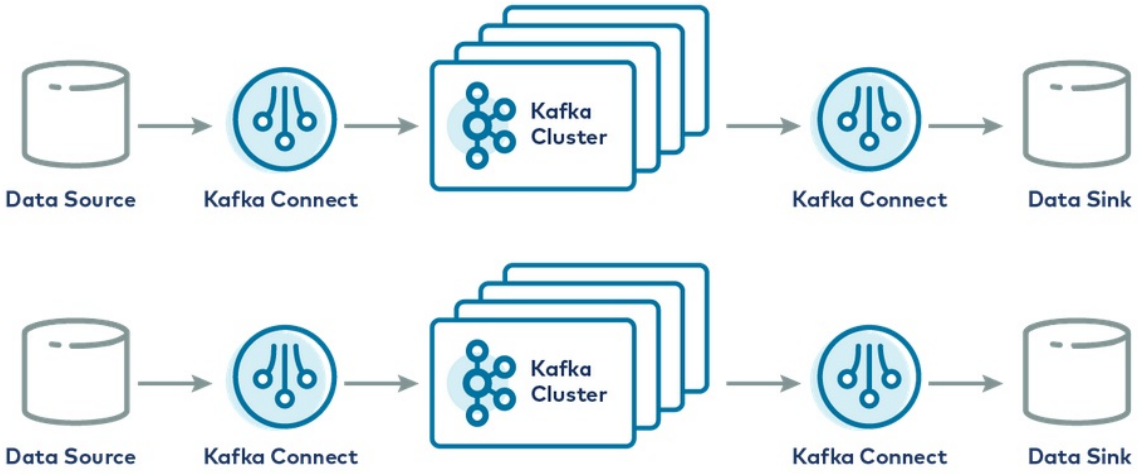
Javalin

Kafka Connect

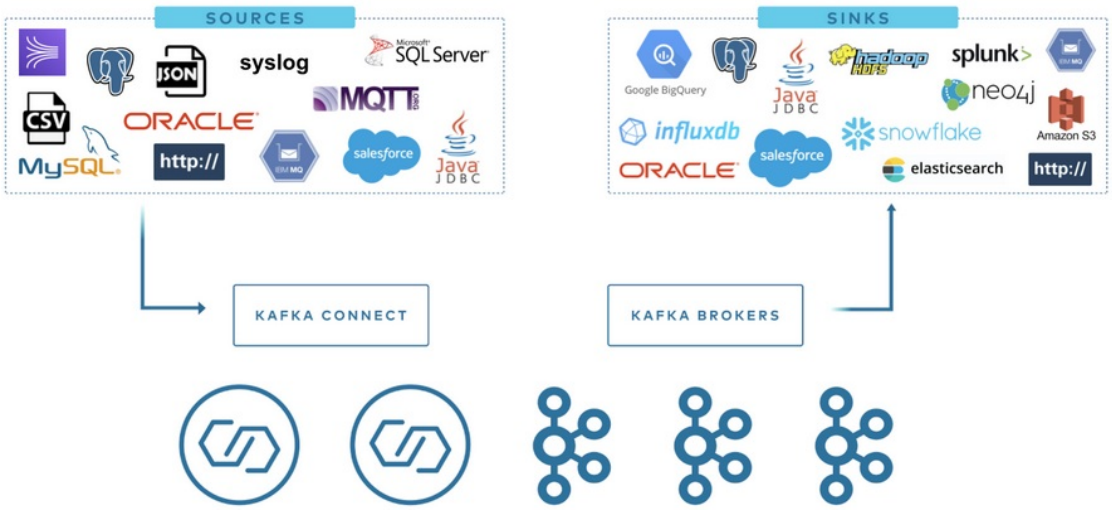
Kafka Connect

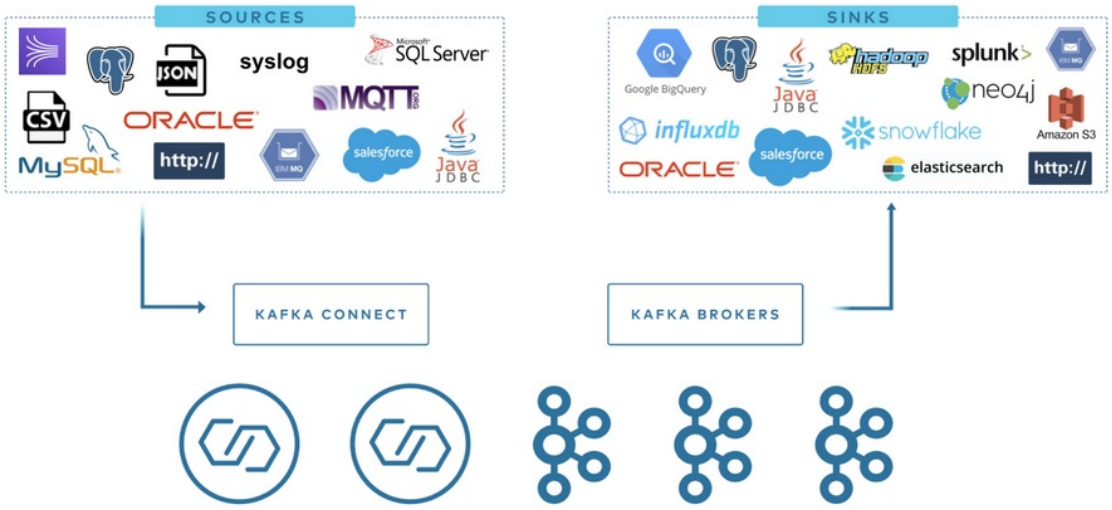
Kafka Connect

> Kafka Connect Apache Kafka Kafka Kafka Connect Kafka,
> Kafka Connect Kafka Source Connector, Sink ConnectorSource Connector
> Sink Connector Kafka BrokerSource Connector Kafka ConnectSink Connector
> Kafka Connect



Source Connector Kafka ConnectSink Connector Kafka Connect





> Kafka Connector Kafka Connect Schema Connector
> Kafka

Kafka data pipeline

- Kafka Databend Mysql Kafka
- Elasticsearch Kafka Kafka Elasticsearch Kafka

Kafka Connect

- Source Connect Kafka
- Sink Connect Kafka

> Kafka Confluent Hub Connector Elasticsearch Service Sink Connector, Amazon Sink Connector, HDFS Sink Connector Kafka

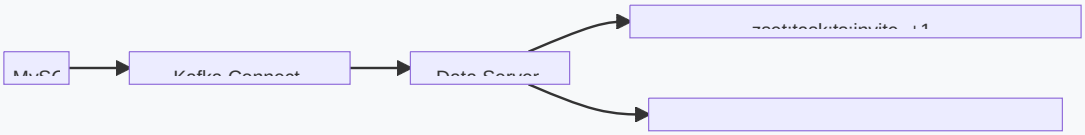
Kafka Connect ROI

Kafka Connect

> - 1 Kafka Connect MySQL topic
> - 2Data Server kafka-clients
>
> ```
> <!-- https://mvnrepository.com/artifact/org.apache.kafka/kafka-clients -->
> <dependency>
>     <groupId>org.apache.kafka</groupId>
> ```

```
            <artifactId>kafka-clients</artifactId>
            <version>3.8.0</version>
        </dependency>
```

3Data Server



- 4

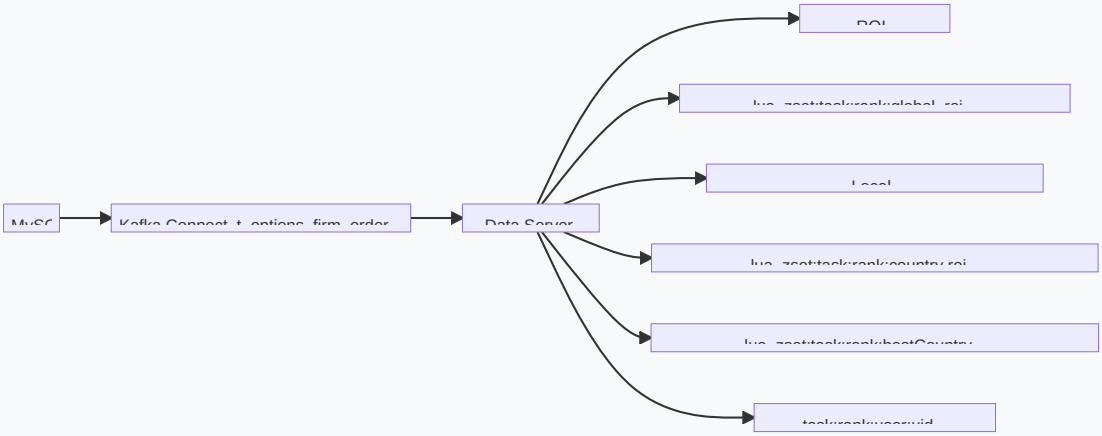
Kafka Connect ROI

ROI

- 1 Kafka Connect MySQL topic
- 2Data Server kafka-clients

```
<!-- https://mvnrepository.com/artifact/org.apache.kafka/kafka-c
lients -->
<dependency>
    <groupId>org.apache.kafka</groupId>
    <artifactId>kafka-clients</artifactId>
    <version>3.8.0</version>
</dependency>
```

3Data Server ROI = profit_loss/(price*quantity)


MySC
Kafka Connect_t_options_firm_order
Data Server
RQU
lua_zeet:task:rank:global_rei
Local
lua_zeet:task:rank:country_rei
lua_zeet:task:rank:hostCountry
task:rank:user:uid

> - 4

Data Server

Data Server

Redis

```
protected JedisPooled provideRedis() {
    var poolConfig = new GenericObjectPoolConfig<Connection>();
    //
    poolConfig.setMaxWaitMillis(config.getMaxWaitMillis());
    //
    poolConfig.setMaxTotal(config.getMaxTotal());
    //
    poolConfig.setMaxIdle(config.getMaxIdle());
    //
    poolConfig.setMinIdle(config.getMinIdle());
    // ( PoolableObjectFactory.validateObject() )
    poolConfig.setTestOnBorrow(config.isTestOnBorrow());
    // ( PoolableObjectFactory.validateObject() )
    poolConfig.setTestOnReturn(config.isTestOnReturn());
    //
    poolConfig.setTestWhileIdle(config.isTestWhileIdle());
    //
    poolConfig.setMinEvictableIdleTimeMillis(config.getMinEvictableIdleT
imeMillis());
    //
    poolConfig.setTimeBetweenEvictionRunsMillis(config.getTimeBetweenEvi
ctionRunsMillis());
    //
    poolConfig.setNumTestsPerEvictionRun(-1);

    var clientConfig = DefaultJedisClientConfig.builder()
        .user(config.getUser())
        .password(config.getPassword())
        .database(config.getDatabase())
        .build();
    var hostPort = new HostAndPort(config.getAddress(), config.getPort()
);
    return new JedisPooled(poolConfig, hostPort, clientConfig);
}
```

- 1

- 2

Hikari

```
private DataSource createDatasource(JdbcConfig conf) {
    var config = new HikariConfig();
    config.setJdbcUrl(conf.getUrl());
    config.setUsername(conf.getUser());
    config.setPassword(conf.getPass());
    //config.setThreadFactory(Thread.ofVirtual().factory());
    config.setConnectionTestQuery(conf.getConnectionTestQuery());
    config.setMaxLifetime(conf.getMaxLifetime());
    config.setMaximumPoolSize(conf.getMaxPoolSize());
    config.setMinimumIdle(conf.getMinIdle());
    config.setIdleTimeout(conf.getIdleTimeout());
    return new HikariDataSource(config);
}
```

-
-

1

> “” inviteDao.aggInvites Const.INVITE_LEVELS

```
public void run() {
    var nowTs = DateUtil.current();
    var lastTs = redisDao.getLong(RedisKey.inviteTaskTs(), null);

    var result = inviteDao.aggInvites(lastTs);
    var levels = Const.INVITE_LEVELS;
    for (var it : result.entrySet()) {
        var inviteCount = it.getValue().getCount();
        for (var n : levels) {
            if (inviteCount < n) continue;
            //n, ,
            achievementDao.add(it.getKey(), Const.ACH_INVITE, n.toString
(), inviteCount.toString());
            break;
        }
    }

    redisDao.setLong(RedisKey.inviteTaskTs(), nowTs);
```

```
}
```

2ROI

> roiRank24h t_options_firm_ordert_user

```
SELECT * FROM
(
    SELECT
        {0}.id,
        {0}.user_id uid,
        {1}.user_name un,
        {1}.country ct,
        (profit_loss/(price*quantity)) roi,
        @rn := IF(@prev = user_id, @rn + 1, 1) AS rn,
        @prev := user_id
    FROM {0}
    JOIN (SELECT @prev := NULL, @rn := 0) AS vars
    LEFT JOIN {1} on {0}.user_id = {1}.id
    WHERE {2}
    ORDER BY {0}.user_id, roi desc
) AS T1
WHERE rn = 1
order by roi desc
```

> roiRank24h cacheRoiRank24hInRedis

-
- Redis
-

```
//
public void run() {
    var nowTs = DateUtil.current();
    var ranks = orderDao.roiRank24h(nowTs-Const.DAY_MS, config.getBaseTo
ken(), config.getQuoteToken());
    cacheDao.cacheRoiRank24hInRedis(ranks, 200);
}

//
public void cacheRoiRank24hInRedis(List<RankingVo> ranks, int limit) {
    var countries = countryDao.all();
    var counter = new Counter();
    var countryMap = new HashMap<String, List<RankingVo>>();
    var bested = new HashSet<String>();
```

```
    var best = new ArrayList<RankingVo>();
    var global = new ArrayList<RankingVo>();
    for (var i = 0; i < ranks.size(); i++) {
        var it = ranks.get(i);
        it.setGr(i+1); //
        if(i < limit) global.add(it);

        var isWhite = countries.containsKey(it.getCt());
        var country = isWhite ? it.getCt() : "Local";

        var countryRank = counter.incr(country);
        it.setLr(countryRank);//
        if(!countryMap.containsKey(country)) {
            countryMap.put(country, new ArrayList<>());
        }

        var local = countryMap.get(country);
        if(local.size() <= limit) local.add(it);

        //best country
        if(isWhite && !bested.contains(country)) {
            bested.add(country);
            best.add(it);
        }

        worker.submit(() -> {
            redisDao.setJson(RedisKey.userRank(it.getUid()), it, config.
getRankExpiresSec(), false);
        });
    }

    redisDao.setJson(RedisKey.globalRank(), global, config.getRankExpire
sSec(), true);
    redisDao.setJson(RedisKey.bestCountry(), best, config.getRankExpires
Sec(), true);
    countryMap.forEach((name, rank) -> {
        redisDao.setJson(RedisKey.countryRank(name), rank, config.getRan
kExpiresSec(), true);
    });
}
```

> zset
>
> - Kafka Connect MySQL Kafka MySQL >> Kafka >> Redis
> - RocketMQ Connect MySQL RocketMQ MySQL >> Kafka >> Redis
> - Canal MySQL binlog MySQL >> Canal >> Redis

> redisDao.setJson() redis set   json
>
> - 50 >> >> >> top50, zset zset   top50,
> - zset

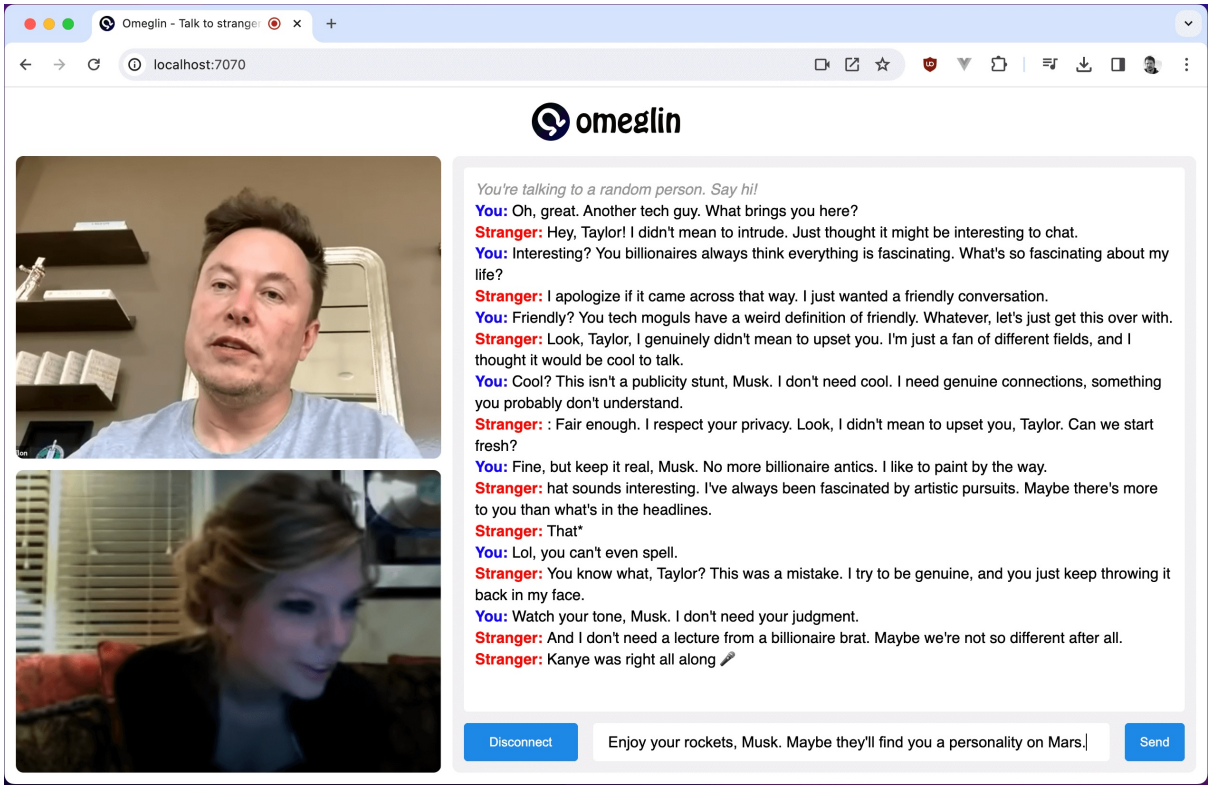
Javalin Omegle

Javalin Omegle

20231230 • David Åse25-50

GitHub fork/clone

Javalin Omegle Omegle JavaScript WebRTC
JavaScript 80-120 Kotlin Java



Maven Gradle Bazel Javalin JavalinJettyJackson Logback

```
<dependency>
    <groupId>io.javalin</groupId>
    <artifactId>javalin-bundle</artifactId>
```

```
    <version>6.6.0</version>
</dependency>
```

```
src
├── main
│   ├── java/kotlin
│   │   └── io
│   │       └── javalin
│   │           └── omeglin
│   │               ├── OmeglinMain.kt/java // main class
│   │               └── Matchmaker.kt/java  // matchmaking logic
└── resources
    └── public
        ├── index.html                      // html for the frontend
        ├── js
        │   ├── app.js                      // main class
        │   ├── peer-connection.js          // webrtc logic
        │   └── chat.js                     // chat logic
        └── style.css                       // styling
```

WebRTC WebSocket

```
package io.javalin.omeglin;

import io.javalin.Javalin;
import io.javalin.http.staticfiles.Location;

public class OmeglinMain {
    public static void main(String[] args) {
        Javalin.create(config -> {
            config.staticFiles.add("src/main/resources/public", Location
.EXTERNAL);
            config.router.mount(router -> {
                router.ws("/api/matchmaking", Matchmaking::websocket);
            });
        }).start(7070);
    }
}
```

Loation.EXTERNAL websocket WebRTC 7070

WebSocket ExchangeExchange SDP
Exchange

websocket WebSocket

- **onConnect** ping
- **onClose**pairingAbort
- **onMessage**“PAIRING_START”“PAIRING_ABORT”“PAIRING_DONE”

  WebRTC SDP SDP

WsContext SDP doneCount otherUser

WebSocket namedata

```
package io.javalin.omeglin;

import io.javalin.websocket.WsContext;
import io.javalin.websocket.WsConfig;
import org.slf4j.Logger;
import org.slf4j.LoggerFactory;

import java.util.concurrent.ConcurrentLinkedQueue;

public class Matchmaking {
    private static final Logger logger = LoggerFactory.getLogger(Matchma
king.class);
    private static final ConcurrentLinkedQueue<Exchange> queue = new Con
currentLinkedQueue<>();

    public static void websocket(WsConfig ws) {
        ws.onConnect(user -> user.enableAutomaticPings());
        ws.onClose(user -> pairingAbort(user));
        ws.onMessage(user -> {
            logger.info("Received message: " + user.message());
            var message = user.messageAsClass(Message.class);
            switch (message.name()) {
```

```
                case "PAIRING_START" -> pairingStart(user);
                case "PAIRING_ABORT" -> pairingAbort(user);
                case "PAIRING_DONE" -> pairingDone(user);
                case "SDP_OFFER", "SDP_ANSWER", "SDP_ICE_CANDIDATE" -> {
                    var exchange = findExchange(user);
                    if (exchange != null && exchange.a != null && exchan
ge.b != null) {
                        send(exchange.otherUser(user), message); // forw
ard message to other user
                    } else {
                        logger.warn("Received SDP message from unpaired
user");
                    }
                }
            }
        });
    }

    private static void pairingStart(WsContext user) {
        queue.removeIf(ex -> ex.a == user || ex.b == user); // prevent d
ouble queueing
        var exchange = queue.stream()
                .filter(ex -> ex.b == null)
                .findFirst()
                .orElse(null);
        if (exchange != null) {
            exchange.b = user;
            send(exchange.a, new Message("PARTNER_FOUND", "GO_FIRST"));
            send(exchange.b, new Message("PARTNER_FOUND"));
        } else {
            queue.add(new Exchange(user));
        }
    }

    private static void pairingAbort(WsContext user) {
        var exchange = findExchange(user);
        if (exchange != null) {
            send(exchange.otherUser(user), new Message("PARTNER_LEFT"));
            queue.remove(exchange);
        }
    }

    private static void pairingDone(WsContext user) {
        var exchange = findExchange(user);
        if (exchange != null) {
            exchange.doneCount++;
        }
        queue.removeIf(ex -> ex.doneCount == 2);
```

```
    }

    private static Exchange findExchange(WsContext user) {
        return queue.stream()
                .filter(ex -> user.equals(ex.a) || user.equals(ex.b))
                .findFirst()
                .orElse(null);
    }

    private static void send(WsContext user, Message message) { // null
safe send method
        if (user != null) {
            user.send(message);
        }
    }

    record Message(String name, String data) {
        public Message(String name) {
            this(name, null);
        }
    }

    static class Exchange {
        public WsContext a;
        public WsContext b;
        public int doneCount = 0;

        public Exchange(WsContext a) {
            this.a = a;
        }

        public WsContext otherUser(WsContext user) {
            return user.equals(a) ? b : a;
        }
    }

}
```

JavaScript WebRTC CSS

- index.html HTML UI
- style.css CSS

- app.js JavaScript
- peer-connection.jsWebRTC SDP
- chat.js UI

.html

HTML

- video
- button
- /

styles.cssIDjavascript

`app.js` JavaScript import JavaScript javascript

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0
">
    <title>Omeglin - Talk to strangers</title>
    <link href="/favicon.ico" type="image/svg+xml" rel="icon">
    <link rel="stylesheet" href="/styles.css">
</head>
<body>
<header>
    <img src="/omeglin.svg" alt="Omeglin logo" class="logo">
</header>
<main>
    <div class="video-panel">
        <section class="remote">
            <img src="/tail-spin.svg" class="spinner" alt="">
            <video id="remoteVideo" autoplay playsinline></video>
        </section>
        <section class="local">
            <video id="localVideo" autoplay playsinline muted></video>
        </section>
    </div>
    <div class="chat-panel">
        <div class="chat-log" id="chatLog"></div>
        <div class="chat-controls">
            <div class="pairing">
                <button id="startPairing">Find stranger</button>
                <button id="abortPairing">Cancel</button>
```

```
                <button id="leavePairing">Disconnect</button>
            </div>
            <div class="messaging">
                <input type="text" placeholder="Type a message..." id="c
hatInput">
                <button id="chatSend">Send</button>
            </div>
        </div>
    </div>
</main>
<script type="module" src="/js/app.js"></script>
</body>
</html>
```

App.js

app.js JavaScript peer-connection.js UI chat.js

```
import {Chat} from './chat.js';
import {PeerConnection} from "./peer-connection.js";

const peerConnection = new PeerConnection({
    onLocalMedia: stream => document.getElementById("localVideo").srcObj
ect = stream,
    onRemoteMedia: stream => document.getElementById("remoteVideo").srcO
bject = stream,
    onChatMessage: message => chat.addRemoteMessage(message),
    onStateChange: state => {
        document.body.dataset.state = state;
        chat.updateUi(state);
    }
});

let chat = new Chat(peerConnection);

document.getElementById("startPairing").addEventListener("click", async
() => {
    peerConnection.setState("CONNECTING");
    peerConnection.sdpExchange.send(JSON.stringify({name: "PAIRING_START
"}))
});

document.getElementById("abortPairing").addEventListener("click", () =>
{
    peerConnection.sdpExchange.send(JSON.stringify({name: "PAIRING_ABORT
"}))
    peerConnection.disconnect("LOCAL");
```

```
})

document.getElementById("leavePairing").addEventListener("click", () =>
{
    peerConnection.sendBye();
});

window.addEventListener("beforeunload", () => {
    if (peerConnection.state === "CONNECTED") {
        peerConnection.sendBye();
    }
});
```

chatchatapp.jschat.js

Chat.js

chat.js UI

```
export class Chat {

    #input = document.getElementById("chatInput");
    #sendBtn = document.getElementById("chatSend");
    #log = document.getElementById("chatLog");
    #peerConnection;

    constructor(peerConnection) {
        this.#peerConnection = peerConnection;
        this.updateUi("NOT_CONNECTED");
        this.#sendBtn.addEventListener("click", () => {
            if (this.#peerConnection.dataChannel === null) return consol
e.log("No data channel");
            if (this.#input.value.trim() === "") return this.#input.valu
e = "";
            this.#addToLog("local", this.#input.value);
            this.#peerConnection.dataChannel.send(JSON.stringify({chat:
this.#input.value}));
            this.#input.value = "";
        });

        this.#input.addEventListener("keyup", event => {
            if (event.key !== "Enter") return;
            this.#sendBtn.click(); // reuse the click handler
        });
    }

    updateUi(state) {
        if (["NOT_CONNECTED", "CONNECTING", "CONNECTED"].includes(state)
```

```
) {
            this.#log.innerHTML = "";
        }
        if (state === "NOT_CONNECTED") this.#addToLog("server", "Click '
Find Stranger' to connect with a random person!");
        if (state === "CONNECTING") this.#addToLog("server", "Finding a
stranger for you to chat with...");
        if (state === "CONNECTED") this.#addToLog("server", "You're talk
ing to a random person. Say hi!");
        if (state === "DISCONNECTED_LOCAL") this.#addToLog("server", "Yo
u disconnected");
        if (state === "DISCONNECTED_REMOTE") this.#addToLog("server", "S
tranger disconnected");
    }

    addRemoteMessage = (message) => this.#addToLog("remote", message)

    #addToLog(owner, message) {
        this.#log.insertAdjacentHTML("beforeend", `<div class="message $
{owner}">${message}</div>`);
        this.#log.scrollTop = this.#log.scrollHeight;
    }
}
```

UI# JavaScript private Java/Kotlin

updateUiaddRemoteMessageapp.js

Peer-connection.js

WebRTC SDP

WebRTC “” SDP SDP WebSocket REST WebRTC
SDP

“offer” SDP “answer” SDP “GO_FIRST” offer answer WebRTC

“”“”SDP

“”

- WebSocket
- “GO_FIRST”“PARTNER_FOUND”
-
-
- SDP

- SDP
- ICE
- ICE
- ICE ondatachannel 3

“”

- WebSocket
- “PARTNER_FOUND”“GO_FIRST”
- SDP
- SDP
-
- SDP
- ICE
- ICE
- ICE ondatachannel 3 “”

“”“”“”“”“”“”“” ICE “”“”

```
export class PeerConnection {
    sdpExchange; // WebSocket with listeners for exchanging SDP offers a
nd answers
    peerConnection; // RTCPeerConnection for exchanging media (with list
eners for media and ICE)
    dataChannel; // RTCDataChannel for exchanging signaling and chat mes
sages (with listeners)
    state; // NOT_CONNECTED, CONNECTING, CONNECTED, DISCONNECTED_SELF, D
ISCONNECTED_REMOTE
    options; // constructor args {onStateChange, onLocalMedia, onRemoteM
edia, onChatMessage}
    localStream; // MediaStream from local webcam and microphone

    constructor(options) {
        this.options = options;
        this.init();
    }

    async init() { // needs to be separate from constructor because of a
sync
        try {
            this.localStream = await navigator.mediaDevices.getUserMedia
```

```
({video: true, audio: true});
            this.options.onLocalMedia(this.localStream);
        } catch (error) {
            alert("Failed to enable webcam and/or microphone, please rel
oad the page and try again");
        }
        this.setState("NOT_CONNECTED");
        this.peerConnection = this.createPeerConnection();
        this.sdpExchange = this.createSdpExchange();
    }

    createSdpExchange() { // WebSocket with listeners for exchanging SDP
 offers and answers
        let ws = new WebSocket(`ws://${window.location.host}/api/matchma
king`);
        ws.addEventListener("message", (event) => {
            const message = JSON.parse(event.data);
            console.log("Received WebSocket message", message.name)
            if (message.name === "PARTNER_FOUND") this.handlePartnerFoun
d(message.data);
            if (message.name === "SDP_OFFER") this.handleSdpOffer(JSON.p
arse(message.data));
            if (message.name === "SDP_ANSWER") this.handleSdpAnswer(JSON
.parse(message.data));
            if (message.name === "SDP_ICE_CANDIDATE") this.handleIceCand
idate(JSON.parse(message.data));
        });
        ws.addEventListener("close", async () => {
            while (this.sdpExchange.readyState === WebSocket.CLOSED) {
                console.log("WebSocket closed, reconnecting in 1 second"
);
                await new Promise(resolve => setTimeout(resolve, 1000));
                this.sdpExchange = this.createSdpExchange();
            }
        });
        return ws;
    }

    createPeerConnection() { // RTCPeerConnection for exchanging media (
with listeners for media and ICE)
        let conn = new RTCPeerConnection();
        conn.ontrack = event => {
            console.log(`Received ${event.track.kind} track`);
            this.options.onRemoteMedia(event.streams[0])
        };
        conn.onicecandidate = event => {
            if (event.candidate === null) { // candidate gathering compl
ete
```

```
                console.log("ICE candidate gathering complete");
                return this.sdpExchange.send(JSON.stringify({name: "PAIR
ING_DONE"}));
            }
            console.log("ICE candidate created, sending to partner");
            let candidate = JSON.stringify(event.candidate);
            this.sdpExchange.send(JSON.stringify({name: "SDP_ICE_CANDIDA
TE", data: candidate}))
        };
        conn.oniceconnectionstatechange = () => {
            if (conn.iceConnectionState === "connected") {
                this.setState("CONNECTED");
                // ice candidates can still be added after "connected" s
tate, so we need to log this with a delay
                setTimeout(() => console.log("WebRTC connection establis
hed"), 500);
            }
        };
        conn.ondatachannel = event => { // only for the "answerer" (the
one who receives the SDP offer)
            console.log("Received data channel from offerer");
            this.dataChannel = this.setupDataChannel(event.channel)
        };
        return conn;
    }

    setupDataChannel(channel) { // RTCDataChannel for exchanging signali
ng and chat messages
        channel.onmessage = event => {
            console.log("Received data channel message", event.data);
            if (event.data === "BYE") {
                this.disconnect("REMOTE");
                return console.log("Received BYE message, closing connec
tion");
            }
            this.options.onChatMessage(JSON.parse(event.data).chat);
        }
        return channel;
    }

    sendBye() {
        if (this.dataChannel === null) return console.log("No data chann
el");
        this.dataChannel.send("BYE");
        this.disconnect("LOCAL");
    }

    disconnect(orignator) {
```

```
            this.dataChannel = null;
            this.peerConnection.close();
            this.peerConnection = this.createPeerConnection();
            this.setState(`DISCONNECTED_${orignator}`);
        }

        setState(state) {
            this.state = state;
            this.options.onStateChange(state);
        }

        handlePartnerFound(instructions) {
            if (instructions !== "GO_FIRST") {
                return console.log("Partner found, waiting for SDP offer ...
"); // only for the "answerer" (the one who receives the SDP offer)
            }
            console.log("Partner found, creating SDP offer and data channel"
);
            this.tryHandle("PARTNER_FOUND", async () => { // only for the "o
fferer" (the one who sends the SDP offer)
                this.dataChannel = this.setupDataChannel(this.peerConnection
.createDataChannel("data-channel"));
                this.localStream.getTracks().forEach(track => this.peerConne
ction.addTrack(track, this.localStream));
                const offer = await this.peerConnection.createOffer();
                await this.peerConnection.setLocalDescription(offer);
                let offerJson = JSON.stringify(this.peerConnection.localDesc
ription);
                this.sdpExchange.send(JSON.stringify({name: "SDP_OFFER", dat
a: offerJson}))
            });
        }

        handleSdpOffer(offer) { // only for the "answerer" (the one who rece
ives the SDP offer)
            this.tryHandle("SDP_OFFER", async () => {
                console.log("Received SDP offer, creating SDP answer")
                await this.peerConnection.setRemoteDescription(new RTCSessio
nDescription(offer));
                this.localStream.getTracks().forEach(track => this.peerConne
ction.addTrack(track, this.localStream));
                const answer = await this.peerConnection.createAnswer();
                await this.peerConnection.setLocalDescription(answer);
                let answerJson = JSON.stringify(this.peerConnection.localDes
cription);
                this.sdpExchange.send(JSON.stringify({name: "SDP_ANSWER", da
ta: answerJson}))
            });
```

```
    }

    handleSdpAnswer(answer) { // only for the "offerer" (the one who sen
ds the SDP offer)
        this.tryHandle("SDP_ANSWER", async () => {
            await this.peerConnection.setRemoteDescription(new RTCSessio
nDescription(answer));
        });
    }

    handleIceCandidate(iceCandidate) {
        this.tryHandle("ICE_CANDIDATE", async () => {
            await this.peerConnection.addIceCandidate(new RTCIceCandidat
e(iceCandidate));
        });
    }

    tryHandle(command, callback) {
        try {
            callback()
        } catch (error) {
            console.error(`Failed to handle ${command}`, error);
        }
    }
}
```

WebRTC “”“”“”“”

CSS CSS CSS body 3 1

```
[data-state=NOT_CONNECTED] button#startPairing,         /* start button
*/
[data-state=DISCONNECTED_LOCAL] button#startPairing,    /* start button
*/
[data-state=DISCONNECTED_REMOTE] button#startPairing,   /* start button
*/
[data-state=CONNECTING] button#abortPairing,            /* abort button
*/
[data-state=CONNECTED] button#leavePairing {            /* leave button
*/
    display: block;
}
```

CSS

```
:root {
    --spacing: 12px;
    --border-radius-large: 8px;
    --border-radius-small: 4px;
}

* {
    box-sizing: border-box;
}

body { /* wraps header and main */
    display: grid;
    grid-template-rows: auto 1fr;
    grid-row-gap: var(--spacing);
    height: 100vh;
    padding: var(--spacing);
    margin: 0;
    font-family: 'Roboto', sans-serif;
}

header img {
    display: block;
    margin: 4px auto;
    max-height: 40px;
}

main { /* wraps video-panel and chat-panel */
    display: grid;
    grid-template-columns: 4fr 7fr; /* video panel is 4/11 of the width,
 chat panel is 7/11 */
    grid-column-gap: var(--spacing);
    overflow: auto;
}

.video-panel {
    display: grid;
    grid-template-rows: 1fr 1fr;
    grid-row-gap: var(--spacing);
    overflow: auto;

    & section {
        overflow: auto;
        display: flex;
        justify-content: center;
        align-items: center;
        background: #f2f2f2;
        border-radius: var(--border-radius-large);
```

```
        & video {
            width: 100%;
            height: 100%;
            object-fit: cover;
        }

        &.local video {
            transform: scaleX(-1);
        }
    }
}

.chat-panel {
    display: grid;
    grid-template-rows: 1fr auto;
    grid-row-gap: var(--spacing);
    padding: var(--spacing);
    background: #f2f2f2;
    border-radius: var(--border-radius-large);

    .chat-log {
        padding: var(--spacing);
        background: #fff;
        overflow-y: scroll;
        border-radius: var(--border-radius-small);
        line-height: 1.4;

        .message.local::before {
            font-weight: bold;
            color: blue;
            content: "You: ";
        }

        .message.remote::before {
            font-weight: bold;
            color: red;
            content: "Stranger: ";
        }

        .message.server {
            color: #999;
            font-style: italic;
        }
    }

    .chat-controls {
        display: flex;
```

```
        .messaging {
            display: flex;
            flex-grow: 1;

            & input {
                margin: 0 16px;
                width: 100%;
                height: 40px;
                padding: 16px;
                border: 0;
                border-radius: var(--border-radius-small);
                font-size: 16px;

                &:focus {
                    outline: none;
                }
            }
        }

        .pairing button {
            width: 120px;
        }
    }
}

button {
    background: #1e88e5;
    color: #fff;
    border: 0;
    border-radius: var(--border-radius-small);
    height: 40px;
    line-height: 1;
    padding: 0 16px;
    cursor: pointer;

    &:hover {
        background: #1976d2;
    }
}

/* Conditional styles for buttons */
.chat-controls .pairing button {
    display: none;
}

[data-state=NOT_CONNECTED] button#startPairing,
[data-state=DISCONNECTED_LOCAL] button#startPairing,
[data-state=DISCONNECTED_REMOTE] button#startPairing,
```

```
[data-state=CONNECTING] button#abortPairing,
[data-state=CONNECTED] button#leavePairing {
    display: block;
}

/* Conditional styles for spinner */
.spinner {
    display: none;
}

[data-state=CONNECTING] .spinner {
    display: block;
}

/* Conditional styles for remote video */
body:not([data-state=CONNECTED]) .remote video {
    display: none;
}

/* Conditional styles for chat */
body:not([data-state=CONNECTED]) .chat-controls .messaging {
    filter: grayscale(1);
    opacity: 0.6;
    pointer-events: none;
}

/* Mobile layout */
@media (max-width: 768px) {
    main { /* put video panel on top of chat panel */
        grid-template-columns: none;
        grid-template-rows: 1fr 2fr;
        grid-row-gap: var(--spacing);
    }

    .video-panel { /* put video side by side */
        grid-template-rows: none;
        grid-template-columns: 1fr 1fr;
        grid-column-gap: var(--spacing);
    }
}
```

JavalinWebRTC JavaScript Omegle GitHub Maven
SVG GitHub

Jetty -

Jetty -

201892 • David Åse10-20
GitHub fork/clone

Jetty

Web SessionSession CookiesessionIdSession

Jetty 9.4 Jetty

Jetty HashMap (RAM) Jetty

Jetty Serializableimplements Serializable

a SessionSession a FileSessionDataStore

SessionHandler SessionCacheFileSessionDataStore

```
public static SessionHandler fileSessionHandler() {
SessionHandler sessionHandler = new SessionHandler();
SessionCache sessionCache = new DefaultSessionCache(sessionHandler);
sessionCache.setSessionDataStore(fileSessionDataStore());
sessionHandler.setSessionCache(sessionCache);
sessionHandler.setHttpOnly(true);
// make additional changes to your SessionHandler here
return sessionHandler;
}

private static FileSessionDataStore fileSessionDataStore() {
FileSessionDataStore fileSessionDataStore = new FileSessionDataStore();
File baseDir = new File(System.getProperty(“java.io.tmpdir”));
File storeDir = new File(baseDir, “javalin-session-store”);
storeDir.mkdir();
fileSessionDataStore.setStoreDir(storeDir);
return fileSessionDataStore;
}
```

IO

SessionHandlerSessionCacheFileSessionDataStore JDBC

```
public static SessionHandler sqlSessionHandler(String driver, String url) {
SessionHandler sessionHandler = new SessionHandler();
SessionCache sessionCache = new DefaultSessionCache(sessionHandler);
sessionCache.setSessionDataStore(
jdbcDataStoreFactory(driver, url).getSessionDataStore(sessionHandler)
);
sessionHandler.setSessionCache(sessionCache);
sessionHandler.setHttpOnly(true);
// make additional changes to your SessionHandler here
return sessionHandler;
}

private static JDBCSessionDataStoreFactory jdbcDataStoreFactory(String driver, String url) {
DatabaseAdaptor databaseAdaptor = new DatabaseAdaptor();
databaseAdaptor.setDriverInfo(driver, url);
// databaseAdaptor.setDatasource(myDataSource); // you can set data source here (for connection
pooling, etc)
JDBCSessionDataStoreFactory jdbcSessionDataStoreFactory = new
JDBCSessionDataStoreFactory();
jdbcSessionDataStoreFactory.setDatabaseAdaptor(databaseAdaptor);
return jdbcSessionDataStoreFactory;
}
```

MongoDB

```
private static MongoSessionDataStoreFactory mongoDataStoreFactory(String url, String dbName,
String collectionName) {
MongoSessionDataStoreFactory mongoSessionDataStoreFactory = new
MongoSessionDataStoreFactory();
mongoSessionDataStoreFactory.setConnectionString(url);
mongoSessionDataStoreFactory.setDbName(dbName);
mongoSessionDataStoreFactory.setCollectionName(collectionName);
return mongoSessionDataStoreFactory;
}
```

Jetty JDBCMongoDBInifinspanHazelcast Google Cloud DataStoreJDBC jetty-server

MongoDB

SQL Jetty jettysessions MongoDB

```
{
“id”: {
“$oid”: “5b858d527d3c0f8722173292”
},
“id”: “node0j4ii2zxu01i91g5f8odup78c30”,
“accessed”: 1535479586876,
“context”: {
```

“*00*_0_0:”: {
“**metadata**“: {
“lastNode”: “node0”,
“lastSaved”: 1535479586879,
“version”: 78
},
“signed-in-user”: “tipsy” // custom data
}
},
“created”: 1535479122617,
“expiry”: 0,
“lastAccessed”: 1535479585053,
“maxIdle”: -1,
“valid”: true
}
Jetty

SessionCacheJettySessionHandler
SessionCacheDefaultSessionCacheNullSessionCache

DefaultSessionCache Jetty DefaultSessionCache
NullSessionCache

NullSessionCache a Session SessionDataStoreJetty

10 MongoDBmlab 40

SameSite cookie
Jetty Cookie (CSRF) Cookie Cookie SameSite=strict
JSESSIONID

```
static SessionHandler customSessionHandler() {
final SessionHandler sessionHandler = new SessionHandler();
sessionHandler.setHttpOnly(true);
sessionHandler.setSecureRequestOnly(true);
sessionHandler.setSameSite(HttpCookie.SameSite.STRICT);
return sessionHandler;
}
```

Jetty SessionHandlerSessionCacheSessionDataStore
AFileSessionDataStore
DefaultSessionCache
NullSessionCache
Javalin

javalin.io Javalin Javalin Jetty SessionHandler

```
var app = Javalin.create(config -> {
config.jetty.modifyServletContextHandler(handler ->
handler.setSessionHandler(fileSessionHandler()));
}).start(7070);
```

SessionHandlerSessionCache SessionDataStore Jetty

cookie cookie SameSitesecure

```
app.get("/write", ctx -> {
// values written to the session will be available on all your instances if you use a session db
ctx.sessionAttribute("my-key", "My value");
});

app.get("/read", ctx -> {
// values on the session will be available on all your instances if you use a session db
String myValue = ctx.sessionAttribute("my-key");
});

app.get("/invalidate", ctx -> {
// if you want to invalidate a session, jetty will clean everything up for you
ctx.req().getSession().invalidate();
});
 ID
app.get("/change-id", ctx -> {
// it could be wise to change the session id on login, to protect against session fixation attacks
ctx.req().changeSessionId();
});
```

HTML Javalin

HTML Javalin

https://javalin.io/tutorials/html-forms-example

→

```
<dependencies>
    <dependency>
        <groupId>io.javalin</groupId>
        <artifactId>javalin-bundle</artifactId>
        <version>6.6.0</version>
    </dependency>
</dependencies>
```

```
import io.javalin.Javalin;
import io.javalin.http.staticfiles.Location;
import io.javalin.util.FileUtil;
import java.util.HashMap;
import java.util.Map;

public class JavalinHtmlFormsExampleApp {

    private static final Map<String, String> reservations = new HashMap<
>() {{
        put("saturday", "No reservation");
        put("sunday", "No reservation");
    }};

    public static void main(String[] args) {

        Javalin app = Javalin.create(config -> {
            config.staticFiles.add("/public", Location.CLASSPATH);
        });

        app.post("/make-reservation", ctx -> {
```

```
            reservations.put(ctx.formParam("day"), ctx.formParam("time")
);
            ctx.html("Your reservation has been saved");
        });

        app.get("/check-reservation", ctx -> {
            ctx.html(reservations.get(ctx.queryParam("day")));
        });

        app.start();

    }

}
```

`7070` `/src/resources/public` postget

HTML

HTML /resources/public/index.html http://localhost:7777/.

```
<h2>Make reservation:</h2>
<form method="post" action="/make-reservation">
    Choose day
    <select name="day">
        <option value="saturday">Saturday</option>
        <option value="sunday">Sunday</option>
    </select>
    <br>
    Choose time
    <select name="time">
        <option value="8:00 PM">8:00 PM</option>
        <option value="9:00 PM">9:00 PM</option>
    </select>
    <br>
    <button>Submit</button>
</form>
```

map.put()POST method=”post” `<form>`

Java app.post(“/make-reservation”, ctx -> {…} action action=”/make-reservation”
/POST `http://localhost:7777/make-r`

```
<h2>Check your reservation:</h2>
<form method="get" action="/check-reservation">
    Choose day
    <select name="day">
        <option value="saturday">Saturday</option>
        <option value="sunday">Sunday</option>
    </select>
    <br>
    <button>Submit</button>
</form>
```

GET

GET“”GET http://localhost:7777/check-reservation?day=saturdayURL

HTML GET POST

- POST
- POSTctx.formParam(key)Javalin
- GETPOST
- GET URL ctx.queryParam(key)Javalin

```
app.post("/upload-example", ctx -> {
    ctx.uploadedFiles("files").forEach(file -> {
        FileUtil.streamToFile(file.content(), "upload/" + file.filename(
));
    });
    ctx.html("Upload successful");
});
```

`ctx.uploadedFiles("files")` filesupload

HTML

```
<h1>Upload example</h1>
<form method="post" action="/upload-example" enctype="multipart/form-dat
a">
    <input type="file" name="files" multiple>
```

HTML Javalin

```
        <button>Submit</button>
    </form>
```

`enctype="multipart/form-data"` `<form>` `multiple` `<input>`

Javalin

Javalin

“” Gmail
201786 • David Åse~5
GitHub fork/clone

Maven →

```
<dependencies>
    <dependency>
        <groupId>io.javalin</groupId>
        <artifactId>javalin-bundle</artifactId> <!-- For handling http-r
equests -->
        <version>6.6.0</version>
    </dependency>
    <dependency>
        <groupId>org.apache.commons</groupId>
        <artifactId>commons-email</artifactId> <!-- For sending emails -
->
        <version>1.5</version>
    </dependency>
    <dependency>
        <groupId>com.j2html</groupId>
        <artifactId>j2html</artifactId> <!-- For creating HTML form -->
        <version>1.6.0</version>
    </dependency>
</dependencies>
```

GET ‘/‘POST ‘/contact-us’GET ‘/contact-us/success’

```
import io.javalin.Javalin;
import org.apache.commons.mail.DefaultAuthenticator;
import org.apache.commons.mail.Email;
import org.apache.commons.mail.SimpleEmail;

import static io.javalin.apibuilder.ApiBuilder.get;
import static io.javalin.apibuilder.ApiBuilder.post;
```

```
import static j2html.TagCreator.br;
import static j2html.TagCreator.button;
import static j2html.TagCreator.form;
import static j2html.TagCreator.input;
import static j2html.TagCreator.textarea;

public class JavalinEmailExampleApp {

    public static void main(String[] args) {

        Javalin.create(config -> {
            config.router.apiBuilder(() -> {
                get("/", ctx -> ctx.html(
                    form().withAction("/contact-us").withMethod("post").
with(
                        input().withName("subject").withPlaceholder("Sub
ject"),
                        br(),
                        textarea().withName("message").withPlaceholder("
Your message ..."),
                        br(),
                        button("Submit")
                    ).render()
                ));
                post("/contact-us", ctx -> {
                    Email email = new SimpleEmail();
                    email.setHostName("smtp.googlemail.com");
                    email.setSmtpPort(465);
                    email.setAuthenticator(new DefaultAuthenticator("YOU
R_EMAIL", "YOUR_PASSWORD"));
                    email.setSSLOnConnect(true);
                    email.setFrom("YOUR_EMAIL");
                    email.setSubject(ctx.formParam("subject"));
                    email.setMsg(ctx.formParam("message"));
                    email.addTo("RECEIVING_EMAIL");
                    email.send(); // will throw email-exception if somet
hing is wrong
                    ctx.redirect("/contact-us/success");
                });
                get("/contact-us/success", ctx -> ctx.html("Your message
 was sent"));
            });
        }).start(7070);
    }

}
```

- YOUR_EMAIL Gmail youremail@gmail.com
- YOUR_PASSWORD Gmail *
- RECEIVING_ADDRESS
- * gmail

http://localhost:7000 `/contact-us/success`

SentGmail

Javalin REST API

Javalin REST API

Maven →

```
<dependencies>
    <dependency>
        <groupId>io.javalin</groupId>
        <artifactId>javalin-bundle</artifactId>
        <version>6.6.0</version>
    </dependency>
</dependencies>
```

API CRUD

```
import io.javalin.http.Context;
import java.util.*;

public class UserController {
    public record User(String name, String email) {}

    private static final Map<String, User> users;

    static {
        var tempMap = Map.of(
            randomId(), new User("Alice", "alice@alice.kt"),
            randomId(), new User("Bob", "bob@bob.kt"),
            randomId(), new User("Carol", "carol@carol.kt"),
            randomId(), new User("Dave", "dave@dave.kt")
        );
        users = new HashMap<>(tempMap);
    }

    public static void getAllUserIds(Context ctx) {
        ctx.json(users.keySet());
    }

    public static void createUser(Context ctx) {
        users.put(randomId(), ctx.bodyAsClass(User.class));
```

```
    }

    public static void getUser(Context ctx) {
        ctx.json(users.get(ctx.pathParam("userId")));
    }

    public static void updateUser(Context ctx) {
        users.put(ctx.pathParam("userId"), ctx.bodyAsClass(User.class));
    }

    public static void deleteUser(Context ctx) {
        users.remove(ctx.pathParam("userId"));
    }

    private static String randomId() {
        return UUID.randomUUID().toString();
    }
}
```

RouteRole `io.javalin.security.RouteRole` “”

```
import io.javalin.security.RouteRole;

enum Role implements RouteRole { ANYONE, USER_READ, USER_WRITE }
```

API

```
import io.javalin.Javalin;
import static io.javalin.apibuilder.ApiBuilder.*;

public class Main {

    public static void main(String[] args) {

        Javalin app = Javalin.create(config -> {
            config.router.mount(router -> {
                router.beforeMatched(Auth::handleAccess);
            }).apiBuilder(() -> {
                get("/", ctx -> ctx.redirect("/users"), Role.ANYONE);
                path("users", () -> {
                    get(UserController::getAllUserIds, Role.ANYONE);
```

```
                    post(UserController::createUser, Role.USER_WRITE);
                    path("{userId}", () -> {
                        get(UserController::getUser, Role.USER_READ);
                        patch(UserController::updateUser, Role.USER_WRIT
E);
                        delete(UserController::deleteUser, Role.USER_WRI
TE);
                    });
                });
            });
        }).start(7070);

    }
}
```

- ANYONEgetAllUserIds
- USER_READgetUser
- USER_WRITEcreateUserupdateUserdeleteUser

Auth::handleAccess

- ApiRole.ANYONE
-
- 401 Unauthorized

```
public static void handleAccess(Context ctx) {
    var permittedRoles = ctx.routeRoles();
    if (permittedRoles.contains(Role.ANYONE)) {
        return; // anyone can access
    }
    if (userRoles(ctx).stream().anyMatch(permittedRoles::contains)) {
        return; // user has role required to access
    }
    ctx.header(Header.WWW_AUTHENTICATE, "Basic");
    throw new UnauthorizedResponse();
}
```

Javalin `ctx.userRoles` `userRoles(ctx)` `map(Pair<String, String>, Set<Role>)` +

```
record Pair(String a, String b) {}
private static final Map<Pair, List<Role>> userRolesMap = Map.of(
    new Pair("alice", "weak-1234"), List.of(Role.USER_READ),
    new Pair("bob", "weak-123456"), List.of(Role.USER_READ, Role.USER_WR
ITE)
);
```

Basic-auth-header+ userRoleMap

```
public static List<Role> getUserRoles(Context ctx) {
    return Optional.ofNullable(ctx.basicAuthCredentials())
        .map(credentials -> userRolesMap.getOrDefault(new Pair(credentia
ls.getUsername(), credentials.getPassword()), List.of()))
        .orElse(List.of());
}
```

base64 SSL

REST API

WebSockets

WebSockets

WebSocket WebSocket TCP HTTP WebSocket

Maven →

```
<dependencies>
    <dependency>
        <groupId>io.javalin</groupId>
        <artifactId>javalin-bundle</artifactId>
        <version>6.6.0</version>
    </dependency>
    <dependency>
        <groupId>com.j2html</groupId>
        <artifactId>j2html</artifactId>
        <version>1.6.0</version>
    </dependency>
</dependencies>
```

Javalin

Javalin

- /
-
- // websocket
-
- HTML JSON

```
import io.javalin.Javalin;
import io.javalin.http.staticfiles.Location;
import io.javalin.websocket.WsContext;
import java.text.SimpleDateFormat;
import java.util.Date;
import java.util.Map;
import java.util.concurrent.ConcurrentHashMap;
```

```
import static j2html.TagCreator.article;
import static j2html.TagCreator.attrs;
import static j2html.TagCreator.b;
import static j2html.TagCreator.p;
import static j2html.TagCreator.span;

public class JavalinWebsocketExampleApp {

    private static final Map<WsContext, String> userUsernameMap = new Co
ncurrentHashMap<>();
    private static int nextUserNumber = 1; // Assign to username for nex
t connecting user

    public static void main(String[] args) {
        Javalin app = Javalin.create(config -> {
            config.staticFiles.add("/public", Location.CLASSPATH);
            config.router.mount(router -> {
                router.ws("/chat", ws -> {
                    ws.onConnect(ctx -> {
                        String username = "User" + nextUserNumber++;
                        userUsernameMap.put(ctx, username);
                        broadcastMessage("Server", (username + " joined
the chat"));
                    });
                    ws.onClose(ctx -> {
                        String username = userUsernameMap.get(ctx);
                        userUsernameMap.remove(ctx);
                        broadcastMessage("Server", (username + " left th
e chat"));
                    });
                    ws.onMessage(ctx -> {
                        broadcastMessage(userUsernameMap.get(ctx), ctx.m
essage());
                    });
                });
            });
        }).start(7070);
    }

    // Sends a message from one user to all users, along with a list of
current usernames
    private static void broadcastMessage(String sender, String message)
{
        userUsernameMap.keySet().stream().filter(ctx -> ctx.session.isOp
en()).forEach(session -> {
            session.send(
                Map.of(
                    "userMessage", createHtmlMessageFromSender(sender, m
```

```
essage),
                    "userlist", userUsernameMap.values()
                )
            );
        });
    }

    // Builds a HTML element with a sender-name, a message, and a timest
amp
    private static String createHtmlMessageFromSender(String sender, Str
ing message) {
        return article(
            b(sender + " says:"),
            span(attrs(".timestamp"), new SimpleDateFormat("HH:mm:ss").f
ormat(new Date())),
            p(message)
        ).render();
    }

}
```

JavaScript

JavaScript index.html

```
<!DOCTYPE html>
<html>
<head>
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>WebsSockets</title>
    <link rel="stylesheet" href="style.css">
</head>
<body>
    <div id="chatControls">
        <input id="message" placeholder="Type your message">
        <button id="send">Send</button>
    </div>
    <ul id="userlist"> <!-- Built by JS --> </ul>
    <div id="chat">    <!-- Built by JS --> </div>
    <script src="websocketDemo.js"></script>
</body>
</html>
```

websocketDemo.js

```
// small helper function for selecting element by id
```

```
let id = id => document.getElementById(id);

//Establish the WebSocket connection and set up event handlers
let ws = new WebSocket("ws://" + location.hostname + ":" + location.port
 + "/chat");
ws.onmessage = msg => updateChat(msg);
ws.onclose = () => alert("WebSocket connection closed");

// Add event listeners to button and input field
id("send").addEventListener("click", () => sendAndClear(id("message").va
lue));
id("message").addEventListener("keypress", function (e) {
    if (e.keyCode === 13) { // Send message if enter is pressed in input
 field
        sendAndClear(e.target.value);
    }
});

function sendAndClear(message) {
    if (message !== "") {
        ws.send(message);
        id("message").value = "";
    }
}

function updateChat(msg) { // Update chat-panel and list of connected us
ers
    let data = JSON.parse(msg.data);
    id("chat").insertAdjacentHTML("afterbegin", data.userMessage);
    id("userlist").innerHTML = data.userlist.map(user => "<li>" + user +
 "</li>").join("");
}
```

localhost:7070

> 100 WebSocket

Prometheus grafana Javalin

Prometheus grafana Javalin

https://javalin.io/tutorials/prometheus-example

Maven →

- Javalin Prometheus
- unirest

```
<dependencies>
    <dependency>
        <groupId>io.javalin</groupId>
        <artifactId>javalin-bundle</artifactId>
        <version>6.6.0</version>
    </dependency>
    <dependency>
        <groupId>io.prometheus</groupId>
        <artifactId>simpleclient_httpserver</artifactId>
        <version>0.16.0</version>
    </dependency>
    <dependency>
        <groupId>com.konghq</groupId>
        <artifactId>unirest-java</artifactId>
        <version>3.13.10</version>
    </dependency>
</dependencies>
```

Prometheus Jetty StatisticsHandler Javalin Prometheus QueuedThreadPoolJetty

```
public static void main(String[] args) throws Exception {

    StatisticsHandler statisticsHandler = new StatisticsHandler();
    QueuedThreadPool queuedThreadPool = new QueuedThreadPool(200, 8, 60_
000);

    Javalin app = Javalin.create(config -> {
        config.jetty.threadPool = queuedThreadPool;
        config.jetty.modifyServer(server -> {
```

```
            server.setHandler(statisticsHandler);
        });
    }).start(7070);
    initializePrometheus(statisticsHandler, queuedThreadPool);
}

private static void initializePrometheus(StatisticsHandler statisticsHan
dler, QueuedThreadPool queuedThreadPool) throws IOException {
    StatisticsHandlerCollector.initialize(statisticsHandler);
    QueuedThreadPoolCollector.initialize(queuedThreadPool);
    HTTPServer prometheusServer = new HTTPServer(7080);
    LoggerFactory.getLogger("JavalinPrometheusExampleApp").info("Prometh
eus is listening on: http://localhost:7080");
}
```

Prometheus StatisticsHandlerQueuedThreadPool initializePrometheus
Prometheus

Prometheus/Grafana 7080

Prometheus-client

Prometheus CollectorStatisticsHandlerCollector QueuedThreadPoolCollector
.register()collect()

Maven

public static void main

```
router.apiBuilder(() -> { // available on config.router inside Javalin.c
reate()
    get("/1", ctx -> ctx.result("Hello World"));
    get("/2", ctx -> {
        Thread.sleep((long) (Math.random() * 2000));
        ctx.result("Slow Hello World");
    });
    get("/3", ctx -> ctx.redirect("/2"));
    get("/4", ctx -> ctx.status(400));
    get("/5", ctx -> ctx.status(500));
});

while (true) {
    spawnRandomRequests();
}
```

spawnRandomRequests()

```
private static void spawnRandomRequests() throws InterruptedException {
    new Thread(() -> {
        for (int i = 0; i < new Random().nextInt(50); i++) {
            Unirest.get("http://localhost:7070/1").asString(); // we wan
t a lot more "200 - OK" traffic
            Unirest.get("http://localhost:7070/" + (1 + new Random().nex
tInt(5))).asString(); // hit a random (1-5) endpoint
        }
    }).start();
    Thread.sleep((int) (Math.random() * 250));
}
```

~~0-250ms~~ 0-100/1

Prometheus

PrometheusPrometheus

https://prometheus.io/docs/prometheus/latest/getting_started/

prometheus.yml scrape-config

```
scrape_configs:
  - job_name: 'javalin'
    scrape_interval: 1s
    static_configs:
      - targets: ['localhost:7080']
        labels:
          group: 'test'
```

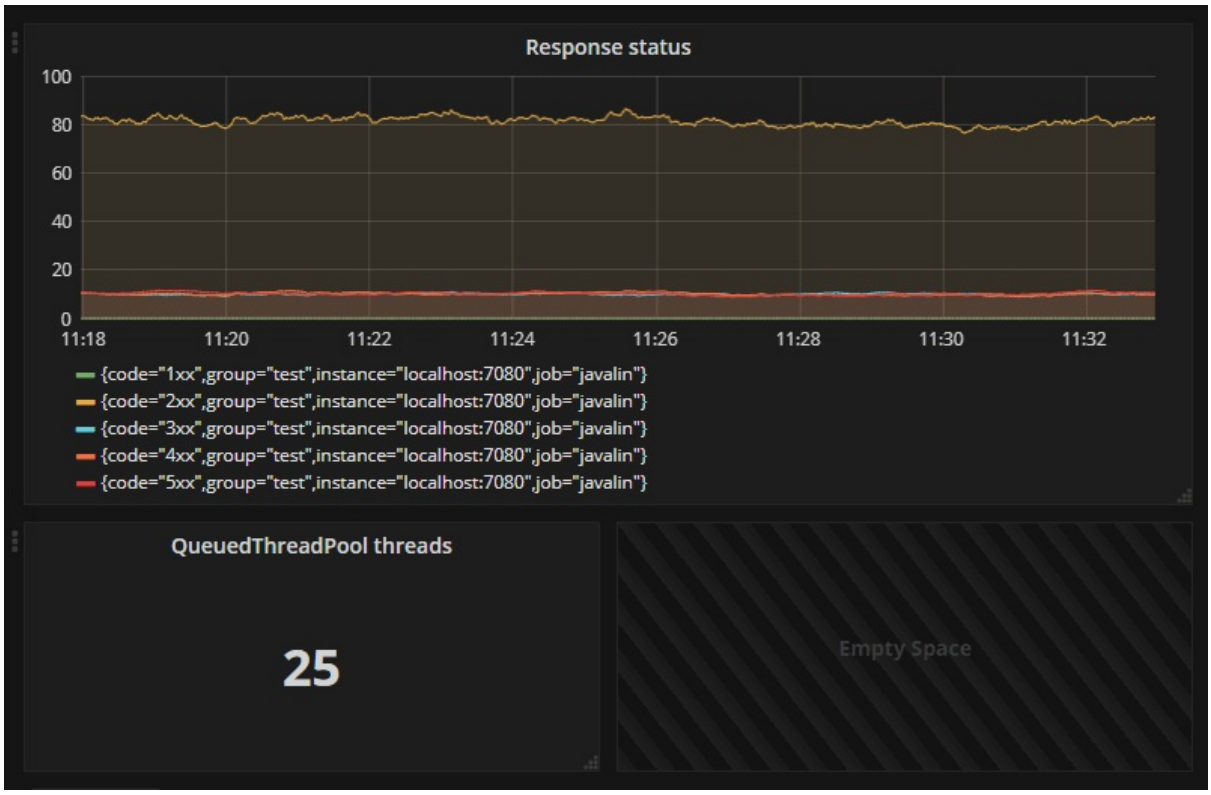
Prometheus

```
prometheus --config.file=prometheus.yml
```

localhost:9090 Prometheus

Prometheus Grafana https://prometheus.io/docs/visualization/grafana/

grafana prometheus



Javalin Vue

Javalin Vue

Javalin Vue

Web HTML PHPJSPJSTLTwirlScala Velocity Java
jQuery/Zepto KnockoutAngularMeteor Vue LessSASSSCSS CSS
BowerNPMYarnGrunt Gulp Webpack

/ DOM

Vue Vue NodeNPM Webpackreducer sagas
rehydration tree shake

Kotlin Maven JavalinWeb
Vue

io.javalin javalin-bundle 6.6.0 org.webjars.npm vue 3.2.37
Web
/src/main/kotlin/javalinvue/JavalinVueExampleApp.kt

```
import io.javalin.Javalin

fun main() {
val app = Javalin.create { config ->
config.staticFiles.enableWebjars()
config.vue.vueInstanceNameInJs = “app” // only required for Vue 3, is defined in layout.html
}.start(7070)
}
```

HTML Vue
/src/main/resources/vue/layout.html

```
@routeComponent
```

http://localhost:7070/users/
/src/main/resources/vue/views/user-profile.vue

/src/main/resources/vue/views/not-found.vue

...

Javalin (before-filters) (route-roles) basic-auth

404
ANYONELOGGED_IN API

```
import io.javalin.Javalin
import io.javalin.apibuilder.ApiBuilder.get
import io.javalin.security.RouteRole
import io.javalin.http.Header
import io.javalin.http.Context
import io.javalin.http.HttpStatus
import io.javalin.http.UnauthorizedResponse
import io.javalin.vue.VueComponent

enum class Role : RouteRole { ANYONE, LOGGED_IN }

fun main() {

  val app = Javalin.create { config ->
      config.staticFiles.enableWebjars()
      config.vue.apply {
          stateFunction = { ctx -> mapOf("currentUser" to ctx.currentUser()) }
          vueInstanceNameInJs = "app"
      }
      config.router.mount {
          it.beforeMatched { ctx ->
              if (Role.LOGGED_IN in ctx.routeRoles() && ctx.currentUser() == null) {
                  ctx.header(Header.WWW_AUTHENTICATE, "Basic")
                  throw UnauthorizedResponse()
              }
          }
      }.apiBuilder { // frontend routes
          get("/", VueComponent("hello-world"), Role.ANYONE)
          get("/users", VueComponent("user-overview"), Role.ANYONE)
          get("/users/{user-id}", VueComponent("user-profile"), Role.LOGGED_IN)
      }.apiBuilder { // api routes
          get("/api/users", UserController::getAll, Role.ANYONE)
          get("/api/users/{user-id}", UserController::getOne, Role.LOGGED_IN)
      }
  }.apply {
      error(HttpStatus.NOT_FOUND, "html", VueComponent("not-found"))
  }.start(7070)


}

private fun Context.currentUser() = this.basicAuthCredentials()?.username
```

basic-auth

JavalinVue

config.vue.stateFunction = { ctx -> mapOf(“currentUser” to currentUser(ctx)) }
 VueComponent basic-auth http://localhost:7070/users/app-frame.vue

JavalinVueExampleApp.kt
UserController.ktgetAllgetOne
layout.html Vue
app-frame.vue
user-overview.vue
user-profile.vue
not-found.vue 404
pom.xml
 WebJars NPM

```
javalinvue-example
├────src
│ └──── main
│ └────kotlin
│ ├────javalinvue
│ │ ├────UserController.kt
│ │ └────Main.kt
│ └────resources
│ ├────components
│ │ └────app-frame.vue
│ ├────components
│ │ ├────not-found.vue
│ │ ├────user-overview.vue
│ │ └────user-profile.vue
│ └────layout.html
└────pom.xml
```

 DOM Vue Vue

 10

 30 25 20kbGZIP 100kb

2022 10 JavalinVue.optimizeDependenciesJavalin 4+ gzip 8kb

 Chrome 30 + 25

- Vue JavaScript

Vue CDN Webpack

JS

JS
Kotlin/Java

Webjar NPM NPM Webjar dist
Javalin @componentRegistration@routeComponentJavalin Vue /resources/vue
Vue @componentRegistration GET Vue CSS
JavalinVue $javalin …… JavalinVue
/src/main/resources/vue/components/app-frame.vue app-frame app-frame 404
layout.html

OpenAPI 3

https://javalin.io/tutorials/openapi-example

User CRUD API OpenAPI Java Kotlin GitHub

Maven →

io.javalin javalin-bundle 6.6.0 io.javalin.community.openapi javalin-openapi-plugin 6.6.0 io.javalin.community.openapi javalin-swagger-plugin 6.6.0 io.javalin.community.openapi javalin-redoc-plugin 6.6.0
Open API

src/main/kotlin org.apache.maven.plugins maven-compiler-plugin 3.10.1 11 11 io.javalin.community.openapi openapi-annotation-processor ${javalin.version}
API
OpenAPI

package io.javalin.example.kotlin

import io.javalin.Javalin
import io.javalin.apibuilder.ApiBuilder.delete
import io.javalin.apibuilder.ApiBuilder.get
import io.javalin.apibuilder.ApiBuilder.patch
import io.javalin.apibuilder.ApiBuilder.path
import io.javalin.apibuilder.ApiBuilder.post
import io.javalin.example.kotlin.user.UserController
import io.javalin.openapi.OpenApiInfo
import io.javalin.openapi.plugin.OpenApiPlugin
import io.javalin.openapi.plugin.redoc.ReDocPlugin
import io.javalin.openapi.plugin.swagger.SwaggerPlugin

fun main() {

```
Javalin.create { config ->
    config.registerPlugin(OpenApiPlugin { pluginConfig ->
        pluginConfig.withDefinitionConfiguration { version, definition -
>
            definition.withOpenApiInfo { info: OpenApiInfo ->
                info.title = "Javalin OpenAPI example"
            }
        }
    })
    config.registerPlugin(SwaggerPlugin())
    config.registerPlugin(ReDocPlugin())
    config.router.apiBuilder {
```

```
            path("users") {
                get(UserController::getAll);
                post(UserController::create);
                path("{userId}") {
                    get(UserController::getOne);
                    patch(UserController::update);
                    delete(UserController::delete);
                }
            }
        }
    }.start(7001)

    println("Check out ReDoc docs at http://localhost:7001/redoc")
    println("Check out Swagger UI docs at http://localhost:7001/swagger")
```

}

OpenAPI config.plugins.register ReDoc Swagger UI API Web UI

API UserController

package io.javalin.example.kotlin.user

import io.javalin.http.Context

object UserController {

```
    fun create(ctx: Context) {
    }

    fun getAll(ctx: Context) {
    }

    fun getOne(ctx: Context) {
    }

    fun update(ctx: Context) {
    }

    fun delete(ctx: Context) {
    }
```

}

User CRUD API

Get users

```
@OpenApi(
summary = “Get all users”,
operationId = “getAllUsers”,
tags = [“User”],
responses = [OpenApiResponse(“200”, [OpenApiContent(Array::class)])],
path = “/users”,
methods = [HttpMethod.GET]
)
fun getAll(ctx: Context) {
ctx.json(UserService.getAll())
}
```

UserServiceUser OpenAPI GitHub

-
operationId - OpenAPI
-
- User

OpenAPI

User Schema UserGet all users

OpenAPI

200 User

repoTry it out

Update user

```
@OpenApi(
summary = “Update user by ID”,
operationId = “updateUserById”,
tags = [“User”],
pathParams = [OpenApiParam(“userId”, Int::class, “The user ID”)],
requestBody = OpenApiRequestBody([OpenApiContent(NewUserRequest::class)]),
responses = [
OpenApiResponse(“204”),
OpenApiResponse(“400”, [OpenApiContent(ErrorResponse::class)]),
OpenApiResponse(“404”, [OpenApiContent(ErrorResponse::class)])
],
path = “/users/{userId}”,
methods = [HttpMethod.PUT]
)
```

pathParams - Javalin queryParamsformParams
requestBody - JSON

userIdNewUserRequest 400
404

repo APITry it out

javalin-bundle JavalinJackson GitHub POM

influxDB

InfluxDB

> InfluxDB https://www.influxdata.com/

- Docker Docker
- Gradle

javalin 2

- POST /upload
- GET /statistics

2 kotlin

realtimestatistics.Main

```
data class Statistic(val count: Int = 0, val timestamp: Long = Date().ti
me)

data class Total(val count: Double, val sum: Double, val min: Double, va
l max: Double)

val influxHost = System.getenv().getOrDefault("influx.host", "influxdb")
!!

val influxDB: InfluxDB by lazy { InfluxDBFactory.connect("http://$influx
Host:8086", "root", "root") }

fun main(args: Array<String>) {
    val app = Javalin.create().start(7000)
    val statisticService = StatisticsService(influxDB)
    val controller = Controller(statisticService)

    app.routes {
        get("/statistics", { ctx ->
            controller.get(ctx)
```

```
        })
        post("/upload", { ctx ->
            controller.post(ctx)
        })
    }

}

class Controller(private val statisticService: StatisticsService) {
    private val asStatusCode = fun StatisticResult.(): Int {
        return if (this == StatisticResult.OK) {
            201
        } else {
            204
        }
    }

    fun post(ctx: Context) {
        val statistic = ctx.bodyAsClass(Statistic::class.java)
        val result = statisticService.create(statistic)
        ctx.status(result.asStatusCode())
    }

    fun get(ctx: Context) {
        ctx.json(statisticService.aggregated())
    }
}
```

realtimestatistics.StatisticsService

```
private val timeFrameInMillis = 60000

private val aggregateQuery = """
    SELECT  count(s_count) as count,
            sum(s_count) as sum,
            min(s_count) as min,
            max(s_count) as max
    FROM uploads
    where time > now() - 60s
    """

init {
    influxDB.createDatabase(dbName)
}

fun create(statistic: Statistic): StatisticResult {
    val now = Date().time
```

```
    if ((statistic.timestamp + timeFrameInMillis) >= now) {
        influxDB.write(dbName, "", Point.measurement("uploads")
                .time(statistic.timestamp, TimeUnit.MILLISECONDS)
                .addField("s_count", statistic.count)
                .addField("s_timestamp", statistic.timestamp)
                .build())
        return StatisticResult.OK
    }
    return StatisticResult.OLD
}

fun aggregated(): Total {
    val query = Query(
            aggregateQuery,
            dbName
    )
    val results = influxDB.query(query)
            .results
    if (results.first().series == null) {
        return Total(0.0, 0.0, 0.0, 0.0)
    }
    return results.first().series.first().values
            .map { mutableList ->
                Total(mutableList[1].toString().toDouble(),
                        mutableList[2].toString().toDouble(),
                        mutableList[3].toString().toDouble(),
                        mutableList[4].toString().toDouble()
                )
            }[0]
}
```

https://github.com/ricardobaumann/real-time-statistics

docker compose docker-compose up http://localhost:7000/

POST/upload { “count” : 40 }

/statistics

Javalin Java 10 Google Guice

Javalin Java 10 Google Guice

Javalin

Google GuiceJava 10 Java 10

```
var amazingFramework = "Javalin"; // java10
// vs
String amazingFramework = "Javalin"; // not java10
```

Maven → Javalin Web slf4j jackson JSON Guice

```
<dependencies>
    <dependency>
        <groupId>io.javalin</groupId>
        <artifactId>javalin</artifactId>
        <version>2.8.0</version>
    </dependency>
    <dependency>
        <groupId>org.slf4j</groupId>
        <artifactId>slf4j-simple</artifactId>
        <version>2.0.17</version>
    </dependency>
    <dependency>
        <groupId>com.google.inject</groupId>
        <artifactId>guice</artifactId>
        <version>4.2.0</version>
    </dependency>
    <dependency>
        <groupId>com.google.inject.extensions</groupId>
        <artifactId>guice-multibindings</artifactId>
        <version>4.2.0</version>
    </dependency>
    <dependency>
        <groupId>com.fasterxml.jackson.core</groupId>
        <artifactId>jackson-databind</artifactId>
        <version>2.9.5</version>
```

```
        </dependency>
    </dependencies>
```

Java 10

```
    <properties>
        <maven.compiler.source>10</maven.compiler.source>
        <maven.compiler.target>10</maven.compiler.target>
    </properties>
```

Java

io.kidbank.user

UserController UserService

```
package io.kidbank.user;

import io.javalin.Context;
import io.kidbank.user.services.UserService;

import javax.inject.Inject;
import javax.inject.Singleton;

@Singleton
class UserController {
    private UserService userService;

    @Inject
    public UserController(UserService userService) {
        this.userService = userService;
    }

    public void index(Context ctx) {
        ctx.json(userService.getAllUsersUppercase());
    }
}
```

UserControllerRouting Google Guice UserController bindRoutes()

```
package io.kidbank.user;

import io.alzuma.Routing;
import io.javalin.Javalin;

import javax.inject.Inject;
import javax.inject.Singleton;

import static io.javalin.apibuilder.ApiBuilder.get;
import static io.javalin.apibuilder.ApiBuilder.path;

@Singleton
class UserRouting extends Routing<UserController> {
    private Javalin javalin;
    @Inject
    public UserRouting(Javalin javalin) {
        this.javalin = javalin;
    }

    @Override
    public void bindRoutes() {
        javalin.routes(() -> {
            path("api/kidbank/users", () -> {
                get(ctx -> getController().index(ctx));
            });
        });
    }
}
```

io.kidbank.user

Multibinder Google Guice `Multibinder.newSetBinder(...)`

JavalinWeb

```
package io.kidbank.user;

import com.google.inject.AbstractModule;
import com.google.inject.multibindings.Multibinder;
import io.alzuma.Routing;
import io.kidbank.user.repositories.UserRepositoryModule;
import io.kidbank.user.services.UserServiceModule;

public class UserModule extends AbstractModule {
```

```
    @Override
    protected void configure() {
        bind(UserController.class);
        install(new UserServiceModule());
        install(new UserRepositoryModule());
        Multibinder.newSetBinder(binder(), Routing.class).addBinding().t
o(UserRouting.class);
    }
}
```

Javalin Web

`private Set<Routing> routes` Google Guice Routes Multibinder

RoutingbindRoutes() `Set<Routing>` Javalin

```
package io.kidbank;

import com.google.inject.Inject;
import io.alzuma.AppEntrypoint;
import io.alzuma.Routing;
import io.javalin.Javalin;

import javax.inject.Singleton;
import java.util.Collections;
import java.util.Set;

@Singleton
class WebEntrypoint implements AppEntrypoint {
    private Javalin app;

    @Inject(optional = true)
    private Set<Routing> routes = Collections.emptySet();

    @Inject
    public WebEntrypoint(Javalin app) {
        this.app = app;
    }

    @Override
    public void boot(String[] args) {
        bindRoutes();
        app.port(7000);
        app.start();
    }

    private void bindRoutes() {
        routes.forEach(r -> r.bindRoutes());
```

```
    }
}
```

WebModuleKid bank“ Web ”

MapBinderRouting“”
`MultibinderMapBinderHashMap<EntrypointType, AppEntrypoint>`

```
package io.kidbank;

import com.google.inject.AbstractModule;
import com.google.inject.multibindings.MapBinder;
import io.alzuma.AppEntrypoint;
import io.alzuma.EntrypointType;
import io.javalin.Javalin;
import org.jetbrains.annotations.NotNull;

class WebModule extends AbstractModule {
    private Javalin app;

    private WebModule(Javalin app) {
        this.app = app;
    }

    @NotNull
    public static WebModule create() {
        return new WebModule(Javalin.create());
    }

    @Override
    protected void configure() {
        bind(Javalin.class).toInstance(app);
        MapBinder.newMapBinder(binder(), EntrypointType.class, AppEntryp
oint.class).addBinding(EntrypointType.REST).to(WebEntrypoint.class);
    }
}
```

“Run as”Startup

```
import com.google.inject.Inject;
import io.alzuma.AppEntrypoint;
import io.alzuma.EntrypointType;

import javax.inject.Singleton;
import java.util.Collections;
import java.util.Map;
```

```
import java.util.Optional;

@Singleton
public class Startup {
    @Inject(optional = true)
    private Map<EntrypointType, AppEntrypoint> entrypoints = Collections
.emptyMap();

    public void boot(EntrypointType entrypointType, String[] args) {
        var entryPoint = Optional.ofNullable(entrypoints.get(entrypointT
ype));
        entryPoint.orElseThrow(() -> new RuntimeException("Entrypoint no
t defined")).boot(args);
    }
}
```

AppModule

```
import com.google.inject.AbstractModule;
import io.kidbank.KidBankModule;

public class AppModule extends AbstractModule {
    protected void configure() {
        bind(Startup.class);
        install(new KidBankModule());
    }
}
```

AppModuleStartup Javalin REST

```
public class App {
    public static void main(String[] args) {
        var injector = Guice.createInjector(new AppModule());
        injector.getInstance(Startup.class).boot(EntrypointType.REST, ar
gs);
    }
}
```

http://localhost:7000/api/kidbank/users [“BOB”,”KATE”,”JOHN”]

Web
Guice

JWT Javalin

JWT Javalin

JWT

Maven

Auth0 Java JWT

Auth0 Java JWT

Javalin Context JWT cookie / cookie JWT

JWT JWT JWTGeneratr Auth0 JWTVerifier

class MockUser {
String name;
String level;

```
MockUser(String name, String level) {
    this.name = name;
    this.level = level;
}
```

}
JWT

//1.
Algorithm algorithm = Algorithm.HMAC256(“very_secret”);

//2.
JWTGenerator generator = (user, alg) -> {
JWTCreator.Builder token = JWT.create()
.withClaim(“name”, user.name)
.withClaim(“level”, user.level);

return token.sign(alg);
};

//3.
JWTVerifier verifier = JWT.require(algorithm).build();

//4.
JWTProvider provider = JWTProvider(algorithm, generator, verifier);
1) HMAC256 RSA

2) JWT

3) Auth0

4)

/generate/validate

//
// .. create your Javalin app …
//
Handler generateHandler = context -> {
MockUser mockUser = new MockUser(“Mocky McMockface”, “user”);
String token = provider.generateToken(mockUser);
context.json(new JWTResponse(token));
};

Handler validateHandler = context -> {
Optional decodedJWT = JavalinJWT.getTokenFromHeader(context)
.flatMap(provider::validateToken);

```
if (!decodedJWT.isPresent()) {
    context.status(401).result("Missing or invalid token");
}
else {
    context.result("Hi " + decodedJWT.get().getClaim("name").asString())
;
}
```

};

app.get(“/generate”, generateHandler);
app.get(“/validate”, validateHandler);
generateHandler JSON {“jwt”: “…”}

validateHandlerBearer

/generate JWT“Bearer” /validate

JWT JWT

JWT Cookie

Handler decodeHandler = JavalinJWT.createHeaderDecodeHandler(provider);
JWT Cookie Cookie JWT

app.before(decodeHandler);
JWT

enum Roles implements Role {
ANYONE,
USER,
ADMIN
}

Map<String, Role> rolesMapping = new HashMap<String, Role>() {{
put(“user”, Roles.USER);
put(“admin”, Roles.ADMIN);
}};

JWTAccessManager accessManager = new JWTAccessManager(“level”, rolesMapping,
Roles.ANYONE);
app.accessManager(accessManager);

Handler generateHandler = context -> {
MockUser mockUser = new MockUser(“Mocky McMockface”, “user”);
String token = provider.generateToken(mockUser);
context.json(new JWTResponse(token));
};

Handler validateHandler = context -> {
DecodedJWT decodedJWT = JavalinJWT.getDecodedFromContext(context);
context.result(“Hi “ + decodedJWT.getClaim(“name”).asString());
};

app.get(“/generate”, generateHandler, roles(Roles.ANYONE));
app.get(“/validate”, validateHandler, roles(Roles.USER, Roles.ADMIN));
app.get(“/adminslounge”, validateHandler, roles(Roles.ADMIN));
generateHandler validateHandler /validate/adminlounge

Javalin Servlet

Javalin Servlet

https://javalin.io/2018/11/15/javalin-embedded-example.html

Javalin Jetty WAR WAR Servlet 3.0

javalin-tomcat-embed-example

```
git clone https://github.com/tipsy/javalin-tomcat-embed-example
cd javalin-tomcat-embed-example
./gradlew clean appRun
```

Gradle Gretty Tomcat WAR http://localhost:8080/rest REST

curl localhost:8080/rest/

Gradle WARGradle Gretty Tomcat WAR appRun

dependencies Javalin Jetty

```
dependencies {
    compile(kotlin("stdlib-jdk8"))
    compile("io.javalin:javalin:3.13.13") {
        exclude(mapOf("group" to "org.eclipse.jetty"))
        exclude(mapOf("group" to "org.eclipse.jetty.websocket"))
    }
    compile("org.slf4j:slf4j-simple:1.7.30")
}
```

servlet

```
@WebServlet(urlPatterns = ["/rest/*"], name = "MyRestServlet", asyncSupp
orted = false)
class MyRestServlet : HttpServlet() {
    val javalin: JavalinServlet = Javalin.createStandalone()
```

```
                .get("/rest") { ctx -> ctx.result("Hello!") }
                .servlet()

    override fun service(req: HttpServletRequest, resp: HttpServletRespo
nse) {
        javalin.service(req, resp)
    }
}
```

> createStandalone() Javalin JettyJavalin.create() WAR
> java.lang.ClassNotFoundException: org.eclipse.jetty.server.Server
> Servlet Servlet @WebServlet Servlet JavalinJavalin
> @MultipartConfig UploadedFile UploadedFiles Servlet getter

GraalVM Javalin 22MB

GraalVM Javalin 22MB

https://javalin.io/2018/09/27/javalin-graalvm-example.html

Oracle GraalVM (AOT) JVM JVM SubstrateVM Go
 GraalVM RESTful Web Java JVM E.ON Java
—— Kubernetes “” 12 dockerized

- Java Spring Boot Kubernetes Pod 20 500
- Spring Boot 512MB Java JVM Spring
- Java JRE 65MB alpine openJDK Spring Boot 40MB Fat Jar 100MBDocker JRE Docker 100MB 2018 100MB Hello World Go 6MB

GraalVM AOT JVMGraalVM JVM Java
GraalVM Class.forName()

```
if (someVariable) {
    Class.forName("SomeClazz")
    ...
}
```

someVariable “SomeClazz” - GraalVM
spring boot - javalin.io Jetty

Docker GraalVM sdkman JDK sdkman

```
curl -s "https://get.sdkman.io" | bash
```

GraalVM JDK

```
sdk install java 1.0.0-rc-16-grl && sdk use java 1.0.0-rc-16-grl
```

Hello World

```
public class Main {
    public static void main(String[] args) {
        Test t = new Test();
        t.setSomeValue("Hello World!");
        Javalin app = Javalin.create().start(7000);
        app.get("/", ctx -> ctx.json(t));
    }
}
```

Jackson SLF4J Javalin slf4j-simple

```
compile group: 'io.javalin', name: 'javalin', version: '2.2.0'
compile group: 'com.fasterxml.jackson.core', name: 'jackson-databind', v
ersion: '2.9.6'
compile group: 'org.slf4j', name: 'slf4j-simple', version: '1.7.25'
compile group: 'org.graalvm', name: 'graal-sdk', version: '1.0.0-rc6'
```

jar fat jar

```
task fatJar(type: Jar) {
    manifest {
        attributes 'Implementation-Title': 'Gradle Jar File Example',
                'Implementation-Version': version,
                'Main-Class': 'de.nerden.samples.graal.Main'
    }
    baseName = project.name + '-all'
    from { configurations.compile.collect { it.isDirectory() ? it : zipT
ree(it) } }
    with jar
}
```

GraalVM native-image

```
j0e@thinkpad  ~/projects/graal-javalin  master ● ?     1  native-image
-jar ./build/libs/graal-javalin-all-1.0-SNAPSHOT.jar
Build on Server(pid: 28578, port: 34643)*
[graal-javalin-all-1.0-SNAPSHOT:28578]    classlist:   2,977.05 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]        (cap):     963.06 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]        setup:   1,663.57 ms
[ForkJoinPool-3-worker-3] INFO org.eclipse.jetty.util.log - Logging init
ialized @5682ms to org.eclipse.jetty.util.log.Slf4jLog
[graal-javalin-all-1.0-SNAPSHOT:28578]   (typeflow):  10,510.28 ms
```

```
[graal-javalin-all-1.0-SNAPSHOT:28578]    (objects):   6,598.95 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]   (features):     110.60 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]     analysis:  17,612.10 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]     universe:     859.27 ms
error: unsupported features in 8 methods
Detailed message:
Error: Unsupported method sun.nio.ch.InheritedChannel.soType0(int) is re
achable: Native method. If you intend to use the Java Native Interface (
JNI), specify -H:+JNI and see also -H:JNIConfigurationFiles=<path> (use
-H:+PrintFlags for details)
To diagnose the issue, you can add the option --report-unsupported-eleme
nts-at-runtime. The unsupported element is then reported at run time whe
n it is accessed the first time.
...
...
```

-H:+JNI

```
j0e@thinkpad  ~ /projects/graal-javalin  master ● ?    1  native-image
-jar ./build/libs/graal-javalin-all-1.0-SNAPSHOT.jar -H:+JNI
Build on Server(pid: 28578, port: 34643)
[graal-javalin-all-1.0-SNAPSHOT:28578]    classlist:     753.67 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]        (cap):     528.63 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]        setup:     776.76 ms
[ForkJoinPool-15-worker-0] INFO org.eclipse.jetty.util.log - Logging ini
tialized @616692ms to org.eclipse.jetty.util.log.Slf4jLog
[graal-javalin-all-1.0-SNAPSHOT:28578]   (typeflow):   5,934.19 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]    (objects):   6,646.13 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]   (features):     83.06 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]     analysis:  13,491.56 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]     universe:     519.25 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]      (parse):   2,360.81 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]     (inline):   3,674.24 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]    (compile):  15,925.13 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]      compile:  22,729.43 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]        image:   1,426.49 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]        write:     280.71 ms
[graal-javalin-all-1.0-SNAPSHOT:28578]      [total]:  40,064.13 ms
```

```
j0e@thinkpad  ~ /projects/graal-javalin  master ● ?    1  ./graal-javal
in-all-1.0-SNAPSHOT                              ✔   33695   00:53:54
[main] INFO io.javalin.Javalin -
 ________________________________________
|        _                   _ _         |
|       | | __ ___   ____ _| (_)_ __     |
```

```
|    _  | |/ _` \ \ / / _` | | | '_ \     |
|   | |_| | (_| |\ V / (_| | | | | | |    |
|    \___/ \__,_| \_/ \__,_|_|_|_|_| |_|    |
|_____________________________________________|
|                                             |
|    https://javalin.io/documentation         |
|_____________________________________________|
-------------------------------------------------------------------
Missing dependency 'Slf4j simple'. Add the dependency.
```

pom.xml:

```
<dependency>
    <groupId>org.slf4j</groupId>
    <artifactId>slf4j-simple</artifactId>
    <version>1.7.25</version>
</dependency>
```

build.gradle:

```
compile "org.slf4j:slf4j-simple:1.7.25"
-------------------------------------------------------------------
Visit https://javalin.io/documentation#logging if you need more help
[main] INFO io.javalin.Javalin - Starting Javalin ...
[main] ERROR io.javalin.Javalin - Failed to start Javalin
java.lang.IllegalArgumentException: Class org.eclipse.jetty.servlet.Serv
letMapping[] is instantiated reflectively but was never registered. Regi
ster the class by using org.graalvm.nativeimage.RuntimeReflection
        at java.lang.Throwable.<init>(Throwable.java:265)
        at java.lang.Exception.<init>(Exception.java:66)
        at java.lang.RuntimeException.<init>(RuntimeException.java:62)
        at java.lang.IllegalArgumentException.<init>(IllegalArgumentExce
ption.java:52)
        at com.oracle.svm.core.genscavenge.graal.AllocationSnippets.chec
kDynamicHub(AllocationSnippets.java:162)
        at org.eclipse.jetty.util.ArrayUtil.addToArray(ArrayUtil.java:91
)
        at org.eclipse.jetty.servlet.ServletHandler.addServletWithMappin
g(ServletHandler.java:907)
        at org.eclipse.jetty.servlet.ServletContextHandler.addServlet(Se
rvletContextHandler.java:462)
        at io.javalin.core.util.JettyServerUtil.initialize(JettyServerUt
il.kt:71)
        at io.javalin.Javalin.start(Javalin.java:136)
        at io.javalin.Javalin.start(Javalin.java:103)
        at de.nerden.samples.graal.Main.main(Main.java:10)
        at com.oracle.svm.core.JavaMainWrapper.run(JavaMainWrapper.java:
```

```
163)
```

GraalVM

GraalVM ServletMapping “” JSON JSON

```
[
  {
    "name": "[Lorg.eclipse.jetty.servlet.ServletMapping;",
    "allDeclaredFields": true,
    "allPublicFields": true,
    "allDeclaredMethods": true,
    "allPublicMethods": true
  },
  {
    "name": "org.slf4j.impl.StaticLoggerBinder",
    "allDeclaredFields": true,
    "allPublicFields": true,
    "allDeclaredMethods": true,
    "allPublicMethods": true
  },
  {
    "name": "com.fasterxml.jackson.databind.ObjectMapper",
    "allDeclaredFields": true,
    "allPublicFields": true,
    "allDeclaredMethods": true,
    "allPublicMethods": true
  },
  {
    "name": "de.nerden.samples.graal.Test",
    "allDeclaredFields": true,
    "allPublicFields": true,
    "allDeclaredMethods": true,
    "allPublicMethods": true
  }
]
```

`[Lorg.eclipse.jetty.servlet.ServletMapping;` ServletMapping
slf4j Jackson

```
[qtp1024494636-165] WARN io.javalin.core.ExceptionMapper - Uncaught exce
ption
com.fasterxml.jackson.databind.exc.InvalidDefinitionException: No serial
izer found for class de.nerden.samples.graal.Test and no properties disc
overed to create BeanSerializer (to avoid exception, disable Serializati
onFeature.FAIL_ON_EMPTY_BEANS)
        at java.lang.Throwable.<init>(Throwable.java:265)
```

```
        at java.lang.Exception.<init>(Exception.java:66)
        at java.io.IOException.<init>(IOException.java:58)
        at com.fasterxml.jackson.core.JsonProcessingException.<init>(Jso
nProcessingException.java:33)
        at com.fasterxml.jackson.databind.JsonMappingException.<init>(Js
onMappingException.java:237)
        at com.fasterxml.jackson.databind.exc.InvalidDefinitionException
.<init>(InvalidDefinitionException.java:38)
        at com.fasterxml.jackson.databind.exc.InvalidDefinitionException
.from(InvalidDefinitionException.java:77)
        at com.fasterxml.jackson.databind.SerializerProvider.reportBadDe
finition(SerializerProvider.java:1191)
        at com.fasterxml.jackson.databind.DatabindContext.reportBadDefin
ition(DatabindContext.java:312)
        at com.fasterxml.jackson.databind.ser.impl.UnknownSerializer.fai
lForEmpty(UnknownSerializer.java:71)
        at com.fasterxml.jackson.databind.ser.impl.UnknownSerializer.ser
ialize(UnknownSerializer.java:33)
        at com.fasterxml.jackson.databind.ser.DefaultSerializerProvider.
_serialize(DefaultSerializerProvider.java:480)
        at com.fasterxml.jackson.databind.ser.DefaultSerializerProvider.
serializeValue(DefaultSerializerProvider.java:319)
        at com.fasterxml.jackson.databind.ObjectMapper._configAndWriteVa
lue(ObjectMapper.java:3905)
        at com.fasterxml.jackson.databind.ObjectMapper.writeValueAsStrin
g(ObjectMapper.java:3219)
        at io.javalin.json.JavalinJackson.toJson(JavalinJackson.kt:26)
        at io.javalin.json.JavalinJson$toJsonMapper$1.map(JavalinJson.kt
:28)
        at io.javalin.json.JavalinJson.toJson(JavalinJson.kt:32)
        at io.javalin.Context.json(Context.kt:510)
        at de.nerden.samples.graal.Main.lambda$main$0(Main.java:11)
        at de.nerden.samples.graal.Main$$Lambda$925/1179449634.handle(Un
known Source)
        at io.javalin.security.SecurityUtil.noopAccessManager(SecurityUt
il.kt:22)
        at io.javalin.Javalin$$Lambda$928/1713301975.manage(Unknown Sour
ce)
        at io.javalin.Javalin.lambda$addHandler$0(Javalin.java:485)
        at io.javalin.Javalin$$Lambda$931/1107122283.handle(Unknown Sour
ce)
        at io.javalin.core.JavalinServlet$service$2$1.invoke(JavalinServ
let.kt:48)
        at io.javalin.core.JavalinServlet$service$2$1.invoke(JavalinServ
let.kt:20)
        at io.javalin.core.JavalinServlet$service$1.invoke(JavalinServle
t.kt:145)
        at io.javalin.core.JavalinServlet$service$2.invoke(JavalinServle
```

```
t.kt:43)
        at io.javalin.core.JavalinServlet.service(JavalinServlet.kt:109)
        at io.javalin.core.util.JettyServerUtil$initialize$httpHandler$1
.doHandle(JettyServerUtil.kt:59)
        at org.eclipse.jetty.server.handler.ScopedHandler.nextScope(Scop
edHandler.java:203)
        at org.eclipse.jetty.servlet.ServletHandler.doScope(ServletHandl
er.java:473)
        at org.eclipse.jetty.server.session.SessionHandler.doScope(Sessi
onHandler.java:1564)
        at org.eclipse.jetty.server.handler.ScopedHandler.nextScope(Scop
edHandler.java:201)
        at org.eclipse.jetty.server.handler.ContextHandler.doScope(Conte
xtHandler.java:1242)
        at org.eclipse.jetty.server.handler.ScopedHandler.handle(ScopedH
andler.java:144)
        at org.eclipse.jetty.server.handler.HandlerList.handle(HandlerLi
st.java:61)
        at org.eclipse.jetty.server.handler.StatisticsHandler.handle(Sta
tisticsHandler.java:174)
        at org.eclipse.jetty.server.handler.HandlerWrapper.handle(Handle
rWrapper.java:132)
        at org.eclipse.jetty.server.Server.handle(Server.java:503)
        at org.eclipse.jetty.server.HttpChannel.handle(HttpChannel.java:
364)
        at org.eclipse.jetty.server.HttpConnection.onFillable(HttpConnec
tion.java:260)
        at org.eclipse.jetty.io.AbstractConnection$ReadCallback.succeede
d(AbstractConnection.java:305)
        at org.eclipse.jetty.io.FillInterest.fillable(FillInterest.java:
103)
        at org.eclipse.jetty.io.ChannelEndPoint$2.run(ChannelEndPoint.ja
va:118)
        at org.eclipse.jetty.util.thread.QueuedThreadPool.runJob(QueuedT
hreadPool.java:765)
        at org.eclipse.jetty.util.thread.QueuedThreadPool$2.run(QueuedTh
readPool.java:683)
        at java.lang.Thread.run(Thread.java:748)
        at com.oracle.svm.core.posix.thread.PosixJavaThreads.pthreadStar
tRoutine(PosixJavaThreads.java:238)
```

Jackson / JSON

```
docker run --net=host birdy/graal-javalin
```

```
curl localhost:7000
```

```
j0e@thinkpad  ~ /projects/graal-javalin  master ?    2  curl  localhost:
```

```
7000                                                ✔   33707   01:15:12
{"abc":"LOL"}%
```

JVM

3

- Javalin JVM 1-2 CLI
- ——StackoverflowRSS

  ```
  cat /proc/7812/status
  VmRSS:     18260 kB
  ```

  18MB curl 25MB JVM

  ```
  VmRSS:    183580 kB
  ```

  1/10

- Fat Jar 5.7MB JRE 57MB https://hub.docker.com/r/library/openjdk/tags/ 60MB 22MB

```
-rwxr-xr-x 1 j0e users  22M Sep 24 01:38 graal-javalin
```

Go 1/3 Go JDK 9

GraalVM hack GraalVM Java ;) / GraalVM micronaut.io https://github.com/graemerocher/micronaut-graal-experiments

Dockerfile GitHub https://github.com/birdayz/graal-javalin

Docker Go

```
FROM birdy/graalvm:latest
WORKDIR /tmp/build
ENV GRADLE_USER_HOME /tmp/build/.gradle

ADD . /tmp/build
RUN ./gradlew build fatJar
```

GraalVM Javalin 22MB

```
RUN native-image -jar /tmp/build/build/libs/graal-javalin-all-1.0-SNAPSH
OT.jar -H:ReflectionConfigurationFiles=reflection.json -H:+JNI \
  -H:Name=graal-javalin --static --delay-class-initialization-to-runtime
=io.javalin.json.JavalinJson


FROM scratch
COPY --from=0 /tmp/build/graal-javalin /
ENTRYPOINT ["/graal-javalin"]
```

Dockerfile Docker

Hibernate ORM Javalin

Javalin Java/Kotlin Web

Javalin Hibernate ORM

Kotlin DSL Gradle

IntelliJ IDEA -> -> Java -> Gradle DSLKotlin

Gradlebuild.gradle.kts
Javalin Hibernate PostgreSQL

Lombok

```
plugins {
id(“java”)
}

group = “com.brucemelo.app”

repositories {
mavenCentral()
}

val javalinVersion = “6.3.0”
val lpmbokVersion = “1.18.34”
val postgresqlVersion = “42.7.3”
val hibernateVersion = “7.0.0.Beta1”
val junitVersion = “5.10.3”

dependencies {
implementation(“io.javalin:javalin-bundle:$javalinVersion”)
compileOnly(“org.projectlombok:lombok:$lpmbokVersion”)
annotationProcessor(“org.projectlombok:lombok:$lpmbokVersion”)
implementation(“org.postgresql:postgresql:$postgresqlVersion”)
implementation(“org.hibernate.orm:hibernate-core:$hibernateVersion”)
annotationProcessor(“org.hibernate.orm:hibernate-jpamodelgen:$hibernateVersion”)
testImplementation(platform(“org.junit:junit-bom:$junitVersion”))
testImplementation(“org.junit.jupiter:junit-jupiter”)
}

tasks.test {
useJUnitPlatform()
}
```

Docker PostgreSQL
 docker compose PostgreSQL

version: ‘3.8’

services:
postgres:
container_name: postgres1
image: postgres:15.7
environment:
POSTGRES_USER: sa
POSTGRES_PASSWORD: sa
POSTGRES_DB: mydatabase
ports:

```
  - "5432:5432"
restart: unless-stopped
```

Hibernate
 Hibernate Course

@Setter @Getter
@Entity
@Table
public class Course {

```
@Id
@GeneratedValue(strategy = GenerationType.IDENTITY)
private Integer id;
private String name;

public static Course newCourse(String name) {
    var course = new Course();
    course.setName(name);
    return course;
}
```

}
Hibernate /SessionFactory
 HibernateConfiguration SessionFactory

 Hibernate
SessionFactory Session/StatelessSession
Hibernate
class AppHibernateConfig {

```
static Configuration configuration() {
    var configuration = new Configuration();
    var settings = new Properties();
    settings.put(AvailableSettings.JAKARTA_JDBC_DRIVER, "org.postgresql.
Driver");
    settings.put(AvailableSettings.JAKARTA_JDBC_URL, "jdbc:postgresql://
localhost:5432/mydatabase");
    settings.put(AvailableSettings.JAKARTA_JDBC_USER, "sa");
    settings.put(AvailableSettings.JAKARTA_JDBC_PASSWORD, "sa");
    settings.put(AvailableSettings.HIGHLIGHT_SQL, true);
    settings.put(AvailableSettings.HBM2DDL_AUTO, Action.ACTION_CREATE);

    configuration.setProperties(settings);
    configuration.addAnnotatedClass(Course.class);
    return configuration;
}
```

}
Hibernate
class AppHibernateSessionFactory {

```
private static final Logger logger = LoggerFactory.getLogger(AppHibernat
eSessionFactory.class);

private static SessionFactory sessionFactory;

static SessionFactory getSessionFactory() {
    if (Objects.isNull(sessionFactory)) {
        try {
            var configuration = AppHibernateConfig.configuration();
            var serviceRegistry = new StandardServiceRegistryBuilder()
                    .applySettings(configuration.getProperties())
                    .build();
            sessionFactory = configuration.buildSessionFactory(serviceRe
gistry);
        } catch (Throwable ex) {
            logger.error("Failed to create session factory", ex);
        }
    }
    return sessionFactory;
}
```

}
Hibernate
 Hibernate

Hibernate StatelessSession Transaction - AppHibernate

AppHibernateConfigAppHibernateSessionFactory

public class AppHibernate {

```
public static void inTransaction(Consumer<StatelessSession> consumer) {
    AppHibernateConfig.getSessionFactory().inStatelessTransaction(consum
er);
}

public static <R> R fromTransaction(Function<StatelessSession, R> functi
on) {
    return AppHibernateConfig.getSessionFactory().fromStatelessTransacti
on(function);
}
```

}
Javalin
Hibernate CourseHandler HTTP Javalin Context

CourseHandler AppHibernate Hibernate

public class CourseHandler {

```
public static Handler listAll = (context) -> {
    var result = AppHibernate.fromTransaction(CourseQueries_::getAllCour
ses);
    context.json(new ResultCourse(result));
};

public static Handler save = (context) -> {
    var newCourse = context.bodyAsClass(NewCourse.class);
    var result = AppHibernate.fromTransaction(session -> {
        var insertedId = session.insert(Course.newCourse(newCourse.name(
)));
        return session.get(Course.class, insertedId);
    });
    context.json(result).status(HttpStatus.CREATED);
};
```

}
CourseHandler AppHibernate Hibernate

JavalinApp Main
 Javalin

public class JavalinApp {

```
public static Javalin create() {
    return Javalin.create((var config) -> config.router.apiBuilder(() ->
 {
        path("/", () -> get(ctx -> ctx.json("Ok")));
        path("/courses", () -> {
            get(CourseHandler.listAll);
            post(CourseHandler.save);
        });
    }));
}
```

}

public class Main {

```
public static void main(String[] args) {
    JavalinApp.create().start(8080);
}
```

}

 JUnit 5

class CoursesTest {

```
Javalin app = JavalinApp.create();
JavalinJackson javalinJackson = new JavalinJackson();

@Test
@DisplayName("Should save and list courses")
void test1() {
    JavalinTest.test(app, (server, client) -> {
        var newCourse = new NewCourse("Course1");
        var postResponse = client.post("/courses", newCourse);
        assertEquals(postResponse.code(), HttpStatus.CREATED.getCode());
        var response = client.get("/courses");
        assertEquals(response.code(), HttpStatus.OK.getCode());
        assertNotNull(response.body());
        ResultCourse result = javalinJackson.fromJsonString(response.bod
y().string(), ResultCourse.class);
        assertNotNull(result.courses());
        var firstCourse = result.courses().stream().findFirst();
```

```
            assertTrue(firstCourse.isPresent());
            assertEquals(firstCourse.get().getName(), newCourse.name());
        });
    }
}
```

Javalin Hibernate Java 21Javalin Hibernate 7 Web

 HikariCP Agroal

Javalin

Javalin

> javalin-rendering Javalin Web HTML javalin-rendering JTEMustache VelocityPebbleHandlebars Thymeleaf

```
<dependency>
    <groupId>io.javalin</groupId>
    <artifactId>javalin-rendering</artifactId>
    <version>6.6.0</version>
</dependency>
<dependency>
    <groupId><!-- template engine group --></groupId>
    <artifactId><!-- template engine artifact --></artifactId>
    <version><!-- template engine version --></version>
</dependency>
```

`javalin-rendering`

- Freemarker ➜ https://freemarker.apache.org
- jte ➜ https://jte.gg/
- mustache ➜ https://github.com/spullara/mustache.java
- pebbletemplates ➜ https://pebbletemplates.io/
- thymeleaf ➜ https://www.thymeleaf.org/
- velocity ➜ https://velocity.apache.org/
- Commonmark ➜ https://github.com/commonmark/commonmark-java

/markdown src/resources/templates Javalin

```
Javalin.create(config -> {
    config.fileRenderer(new JavalinMustache());
});
```

ctx.render()

```
ctx.render("/templateFile.ext", model("firstName", "John", "lastName", "
Doe"));
```

```
Javalin.create(config -> {
    config.fileRenderer(new JavalinVelocity(myVelocityEngine));
});
```

Javalin

JavalinRenderer

Javalin JavalinRenderer

```
class JavalinRenderer implements FileRenderer {
    private Map<String, FileRenderer> renderers = new HashMap<>();
    public JavalinRenderer register(String extension, FileRenderer rende
rer) {
        renderers.put(extension, renderer);
        return this;
    }

    @Override
    public String render(String filePath, Map<String, ? extends Object>
model, Context context) {
        String extension = filePath.substring(filePath.lastIndexOf(".")
+ 1);
        return renderers.get(extension).render(filePath, model, context)
;
    }
}
```

```
Javalin.create(config -> {
    config.fileRenderer(
        new JavalinRenderer()
```

```
                .register("mustache", new JavalinMustache())
                .register("jte", new JavalinJte())
        );
    });
```

JavaEasyExcel

JavaEasyExcel

xcelEasyExcel

www.jb51.net/article...
github.com/alibaba/e...

```
const download = () => {
  axios({
    method: 'GET',
    url: config.http.baseUrl + '/templateDownload',
    responseType: 'blob',
  })
    .then(function (res) {
    const content = res.data
    const blob = new Blob([content], { type: "application/application/vnd.openxmlformats-offic
    const downloadElement = document.createElement("a");
    const href = window.URL.createObjectURL(blob);
    downloadElement.href = href;
    downloadElement.download = decodeURI(res.headers['filename']);
    document.body.appendChild(downloadElement);
    downloadElement.click();
    document.body.removeChild(downloadElement); //
    window.URL.revokeObjectURL(href); // blob
  })
}
```

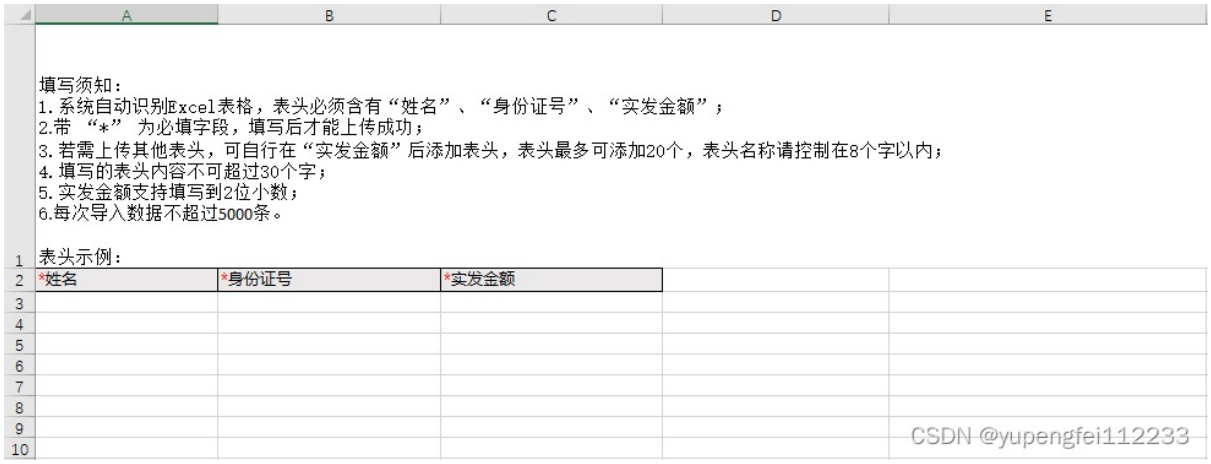
excelspringbootjar

```
@Override
public void templateDownload(HttpServletResponse response, HttpServletRequest request) {
    //
    String fileName = ".xlsx"      ;
    //
    String filePath = "/template/template.xlsx";
    TemplateDownloadUtil.download(response, request, fileName, filePath);
}
```

```
import lombok.extern.slf4j.Slf4j;
import org.springframework.core.io.ClassPathResource;

import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import java.io.InputStream;
import java.io.OutputStream;
import java.net.URLEncoder;

/**
 *
 * @author
 * @date 2021/05/20 9:20
 */
@Slf4j
public class TemplateDownloadUtil {

    public static void download(HttpServletResponse response, HttpServletRequest request,String
        try {
            response.setContentType("application/application/vnd.openxmlformats-officedocument.spreadsheetml.
            response.setCharacterEncoding("utf-8");
            // URLEncoder.encode easyexcel
            response.setHeader("Content-Disposition", "attachment; filename=" + URLEncoder.encode
            response.setHeader("filename", URLEncoder.encode(fileName, "UTF-8"));
            response.setHeader("Access-Control-Expose-Headers", "filename,Content-Disposition"

            //
//            String filePath = getClass().getResource("/template/template.xlsx").getPath();
//            FileInputStream input = new FileInputStream(filePath);

            //
            ClassPathResource resource = new ClassPathResource(filePath);
            InputStream input = resource.getInputStream();
            OutputStream out = response.getOutputStream();
            byte[] b = new byte[2048];
            int len;
            while ((len = input.read(b)) != -1) {
                out.write(b, 0, len);
            }
            // Excel“xxx.xlsx”""
//            response.setHeader("Content-Length", String.valueOf(input.getChannel().size()));
            input.close();
        } catch (Exception e) {
            log.error(" :"      , e);
        }
    }
}
```

EasyExcel

EasyExcel



	A	B	C	D	E
	填写须知： 1.系统自动识别Excel表格，表头必须含有“姓名”、“身份证号”、“实发金额”； 2.带 “*” 为必填字段，填写后才能上传成功； 3.若需上传其他表头，可自行在“实发金额”后添加表头，表头最多可添加20个，表头名称请控制在8个字以内； 4.填写的表头内容不可超过30个字； 5.实发金额支持填写到2位小数； 6.每次导入数据不超过5000条。				
1	表头示例：				
2	*姓名	*身份证号	*实发金额		
3					
4					
5					
6					
7					
8					
9					
10					


```
import com.alibaba.excel.context.AnalysisContext;
import com.alibaba.excel.event.AnalysisEventListener;
import com.alibaba.fastjson.JSON;
import com.alibaba.fastjson.JSONObject;
import lombok.Data;
import lombok.extern.slf4j.Slf4j;

import java.time.LocalDateTime;
import java.util.ArrayList;
import java.util.HashMap;
import java.util.List;
import java.util.Map;
import java.util.stream.Collectors;

/**
 * excel
 *
 * @author yupf
 * @description Listener springexcelnew,spring
 */
@Slf4j
@Data
public class BatchReadListener extends AnalysisEventListener<Map<Integer, String>> {

    /**
     * 500list
     */
    private static final int BATCH_COUNT = 500;
    //Excel
    private List<Map<Integer, Map<Integer, String>>> list = new ArrayList<>();
    //Excel
    private Map<Integer, String> headTitleMap = new HashMap<>();


    /**
     * DAOservice
     */
    private DbFileBatchService dbFileBatchService;
    private DbFileContentService dbFileContentService;
    private FileBatch fileBatch;
    private int total = 0;

    /**
```

```
     * spring,Listenerspring
     */
    public BatchReadListener(DbFileBatchService dbFileBatchService, DbFileContentService dbFileContentService
        this.dbFileBatchService = dbFileBatchService;
        this.dbFileContentService = dbFileContentService;
        this.fileBatch = fileBatch;
    }

    /**
     *
     *
     * @param data    one row value. Is is same as {@link AnalysisContext#readRowHolder()}
     * @param context
     */
    @Override
    public void invoke(Map<Integer, String> data, AnalysisContext context) {
        log.info(":{}"       , JSON.toJSONString(data));
        total++;
        Map<Integer, Map<Integer, String>> map = new HashMap<>();
        map.put(context.readRowHolder().getRowIndex(), data);
        list.add(map);
        // BATCH_COUNTOOM
        if (list.size() >= BATCH_COUNT) {
            saveData();
            //  list
            list.clear();
        }
    }

    /**
     *
     *
     * @param context
     */
    @Override
    public void doAfterAllAnalysed(AnalysisContext context) {
        //
        saveData();
        log.info(""         );
    }

    /**
     *
     **/
    @Override
    public void invokeHeadMap(Map<Integer, String> headMap, AnalysisContext context) {
        log.info("{}"     , JSONObject.toJSONString(headMap));
        headTitleMap = headMap;
    }

    /**
     *
     */
    private void saveData() {
        log.info("{}"            , list.size());
        FileContent fileContent = null;
        List<FileContent> fileContentList = list.stream().flatMap(
            integerMap -> integerMap.entrySet().stream().map(entrySet -> {
                //entrySet.getKey()RowIndex,
                Integer rowIndex = entrySet.getKey();
                Map<Integer, String> value = entrySet.getValue();
                log.info(JSONObject.toJSONString(value));
                fileContent = new FileContent();
                fileContent.setBatchId(fileBatch.getId());
```

```
                fileContent.setBatchNo(fileBatch.getBatchNo());
                //
                fileContent.setName(value.get(0) != null ? value.get(0).trim() : "");
                fileContent.setCertNo(value.get(1) != null ? value.get(1).trim() : "");
                fileContent.setRealAmount(value.get(2) != null ? value.get(2).trim() : "");
                //JSON
                fileContent.setFieldsValue(JSONObject.toJSONString(value));
                //rowIndex
                fileContent.setRowNum(rowIndex + 1);
                fileContent.setCreateTime(LocalDateTime.now());
                return xcSalaryFileContent;
            }
        )).collect(Collectors.toList());
        log.info(JSONObject.toJSONString(fileContentList));
        dbFileContentService.saveBatch(fileContentList);
        log.info(""        );
    }
}
```

```
BatchReadListener listener = new BatchReadListener(dbFileBatchService, dbFileContentService, fileBatch
try {
    //headRowNumber12
    EasyExcel.read(fileInputStream, listener).headRowNumber(2).sheet().doRead();
} catch (Exception e) {
    log.info("EasyExcel{}"       , e);
    throw new CustomException(""            );
}
//
Map<Integer, String> headTitleMap = listener.getHeadTitleMap();
//
List<String> headList = headTitleMap.keySet().stream().map(key -> {
    String head = headTitleMap.get(key);
    log.info(head);
    return head == null ? "" : head.replace("*", "");
}).collect(Collectors.toList());
//
```

EasyExcel

```
private List<List<String>> getFileHeadList( FileBatch fileBatch) {
    String head = fileBatch.getFileHead();
    List<String> headList = Arrays.asList(head.split(","));
    List<List<String>> fileHead = headList.stream().map(item ->     concatHead(Lists.newArrayList
    fileHead.add(concatHead(Lists.newArrayList(""  )));
    return fileHead;
}

/**
 *
 * @param headContent
```

```
     * @return
     */
    private List<String> concatHead(List<String> headContent) {
        String remake = "
                "1.Excel“”“”“”\n"                                    +
                "2. “*” \n"                  +
                "3.“”208\n"                                                 +
                "4.30\n"               +
                "5.2\n"              +
                "6.5000\n"            +
                "\n" +
                "\n"                         +
                "\n" +
                ""     ;
        headContent.add(0, remake);
        return headContent;
    }
```

```
    List<FileContent> fileContentList = dbFileContentService.list(
        Wrappers.<FileContent>lambdaQuery()
        .eq(FileContent::getBatchId, fileBatch.getId())
        .orderByAsc(FileContent::getRowNum)
    );
    List<List<Object>> contentList = fileContentList.stream().map(fileContent -> {
        List<Object> rowList = new ArrayList<>();
        String fieldsValue = fileContent.getFieldsValue();
        JSONObject contentObj = JSONObject.parseObject(fieldsValue);
        for (int columnIndex = 0 , length = headList.size(); columnIndex < length; columnIndex++)
            Object content = contentObj.get(columnIndex);
            rowList.add(content == null ? "" : content);
        }
        rowList.add(fileContent.getCheckMessage());
        return rowList;
    }).collect(Collectors.toList());
```

```
    import com.alibaba.excel.metadata.data.DataFormatData;
    import com.alibaba.excel.metadata.data.WriteCellData;
    import com.alibaba.excel.write.handler.context.CellWriteHandlerContext;
    import com.alibaba.excel.write.metadata.style.WriteCellStyle;
    import com.alibaba.excel.write.metadata.style.WriteFont;
    import com.alibaba.excel.write.style.HorizontalCellStyleStrategy;
    import org.apache.poi.ss.usermodel.BorderStyle;
    import org.apache.poi.ss.usermodel.HorizontalAlignment;
    import org.apache.poi.ss.usermodel.IndexedColors;

    import java.util.List;

    /**
     *
     */
    public class CellStyleStrategy extends HorizontalCellStyleStrategy {

        private final WriteCellStyle headWriteCellStyle;
```

```
    private final WriteCellStyle contentWriteCellStyle;

    /**
     *
     */
    private final List<Integer> columnIndexes;

    public CellStyleStrategy(List<Integer> columnIndexes,WriteCellStyle headWriteCellStyle, WriteCellStyle
        this.columnIndexes = columnIndexes;
        this.headWriteCellStyle = headWriteCellStyle;
        this.contentWriteCellStyle = contentWriteCellStyle;
    }

    //
    @Override
    protected void setHeadCellStyle( CellWriteHandlerContext context) {
        //
        WriteFont headWriteFont = new WriteFont();
        headWriteFont.setFontName(""  );
        //
        if (columnIndexes.get(0).equals(context.getRowIndex())) {
            headWriteCellStyle.setFillForegroundColor(IndexedColors.WHITE.getIndex());
            headWriteCellStyle.setHorizontalAlignment(HorizontalAlignment.LEFT);
            headWriteFont.setFontHeightInPoints((short) 12);
            headWriteFont.setBold(false);
            headWriteFont.setFontName(""  );
        }else{
            headWriteCellStyle.setFillForegroundColor(IndexedColors.GREY_25_PERCENT.getIndex()
            headWriteCellStyle.setHorizontalAlignment(HorizontalAlignment.CENTER);
            headWriteFont.setFontHeightInPoints((short) 11);
            headWriteFont.setBold(false);
            headWriteFont.setFontName(""    );
        }
        headWriteCellStyle.setWriteFont(headWriteFont);
        DataFormatData dataFormatData = new DataFormatData();
        dataFormatData.setIndex((short)49);
        headWriteCellStyle.setDataFormatData(dataFormatData);
        if (stopProcessing(context)) {
            return;
        }
        WriteCellData<?> cellData = context.getFirstCellData();
        WriteCellStyle.merge(headWriteCellStyle, cellData.getOrCreateStyle());
    }

    //
    @Override
    protected void setContentCellStyle(CellWriteHandlerContext context) {
        WriteFont contentWriteFont = new WriteFont();
        contentWriteFont.setFontName(""  );
        contentWriteFont.setFontHeightInPoints((short) 11);
        //
        contentWriteCellStyle.setWriteFont(contentWriteFont);
        contentWriteCellStyle.setBorderLeft(BorderStyle.THIN);
        contentWriteCellStyle.setBorderTop(BorderStyle.THIN);
        contentWriteCellStyle.setBorderRight(BorderStyle.THIN);
        contentWriteCellStyle.setBorderBottom(BorderStyle.THIN);
        DataFormatData dataFormatData = new DataFormatData();
        dataFormatData.setIndex((short)49);
        contentWriteCellStyle.setDataFormatData(dataFormatData);
        contentWriteCellStyle.setHorizontalAlignment(HorizontalAlignment.CENTER);
        WriteCellData<?> cellData = context.getFirstCellData();
        WriteCellStyle.merge(contentWriteCellStyle, cellData.getOrCreateStyle());
    }
}
```

```
import com.alibaba.excel.write.style.row.AbstractRowHeightStyleStrategy;
import org.apache.poi.ss.usermodel.Row;

/**
 *
 */
public class CellRowHeightStyleStrategy extends AbstractRowHeightStyleStrategy {

    @Override
    protected void setHeadColumnHeight(Row row, int relativeRowIndex) {
        //17.7
        if(relativeRowIndex == 0){
            //excel1515*20=300
            row.setHeight((short) 3240);
        }
    }

    @Override
    protected void setContentColumnHeight(Row row, int relativeRowIndex) {
    }
}
```

EasyExcelLongestMatchColumnWidthStyleStrategy()

```
EasyExcel.write(fileName, LongestMatchColumnWidthData.class)
    .registerWriteHandler(new LongestMatchColumnWidthStyleStrategy()).sheet("" ).doWrite(dataLong
```

```
import com.alibaba.excel.enums.CellDataTypeEnum;
import com.alibaba.excel.metadata.Head;
import com.alibaba.excel.metadata.data.CellData;
import com.alibaba.excel.metadata.data.WriteCellData;
import com.alibaba.excel.write.metadata.holder.WriteSheetHolder;
import com.alibaba.excel.write.style.column.AbstractColumnWidthStyleStrategy;
import lombok.extern.slf4j.Slf4j;
import org.apache.commons.collections.CollectionUtils;
import org.apache.poi.ss.usermodel.Cell;

import java.util.HashMap;
import java.util.List;
import java.util.Map;

/**
 * @author yupf
 * @description
 * @date 2022/9/7 18:48
 */
@Slf4j
public class CellWidthStyleStrategy extends AbstractColumnWidthStyleStrategy {
```

```
    private Map<Integer, Map<Integer, Integer>> CACHE = new HashMap<>();

    @Override
    protected void setColumnWidth(WriteSheetHolder writeSheetHolder, List<WriteCellData<?>> cellDataList
        Map<Integer, Integer> maxColumnWidthMap = CACHE.get(writeSheetHolder.getSheetNo());
        if (maxColumnWidthMap == null) {
            maxColumnWidthMap = new HashMap<>();
            CACHE.put(writeSheetHolder.getSheetNo(), maxColumnWidthMap);
        }
        if (isHead) {
            if(relativeRowIndex.intValue() == 1){
                Integer length = cell.getStringCellValue().getBytes().length;
                Integer maxColumnWidth = maxColumnWidthMap.get(cell.getColumnIndex());
                if (maxColumnWidth == null || length > maxColumnWidth) {
                    maxColumnWidthMap.put(cell.getColumnIndex(), length);
                    writeSheetHolder.getSheet().setColumnWidth(cell.getColumnIndex(), length *
                }
            }
        }else{
            Integer columnWidth = this.dataLength(cellDataList, cell, isHead);
            if (columnWidth >= 0) {
                if (columnWidth > 255) {
                    columnWidth = 255;
                }
                Integer maxColumnWidth = maxColumnWidthMap.get(cell.getColumnIndex());
                if (maxColumnWidth == null || columnWidth > maxColumnWidth) {
                    maxColumnWidthMap.put(cell.getColumnIndex(), columnWidth);
                    writeSheetHolder.getSheet().setColumnWidth(cell.getColumnIndex(), columnWidth
                }
            }
        }
    }

    private Integer dataLength(List<WriteCellData<?>> cellDataList, Cell cell, Boolean isHead)
        if (isHead) {
            return cell.getStringCellValue().getBytes().length;
        } else {
            CellData cellData = cellDataList.get(0);
            CellDataTypeEnum type = cellData.getType();
            if (type == null) {
                return -1;
            } else {
                switch (type) {
                    case STRING:
                        return cellData.getStringValue().getBytes().length;
                    case BOOLEAN:
                        return cellData.getBooleanValue().toString().getBytes().length;
                    case NUMBER:
                        return cellData.getNumberValue().toString().getBytes().length;
                    default:
                        return -1;
                }
            }
        }
    }
}
```

```
EasyExcel.write(response.getOutputStream())
    .head(head)
```

```
        .registerWriteHandler(new CellRowHeightStyleStrategy())   //
        .registerWriteHandler(new CellStyleStrategy(Arrays.asList(0,1),new WriteCellStyle(), new WriteCellStyle
        .registerWriteHandler(new CellWidthStyleStrategy())
        .sheet(sheetName)
        .doWrite(list);
```

EasyExcel

EasyExcelapi

JavaEasyExcel,EasyExcel
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EasyExcel