Nodejs web 开发简介

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大纲

- nodejs 简介（安装 ,v8, ECMA 标准兼容性 ,npm ）
- nodejs web 开发框架 express 简介 (restful api, query, params, 文件上传下载，主要结合代码实例进行介绍)
- nodejs 开发调试简介（ console.log, util.inspect, JSON.stringify, node-dev...)
- js 元编程简介（ ECMA proxy 规范， __noSuchMethod__ ）
- Nodejs 异步编程
- Express web 开发框架
- ria-packager 开发中遇到的部分问题及解决方案

About nodejs

http://nodejs.org/

- https://github.com/joyent/node/wiki

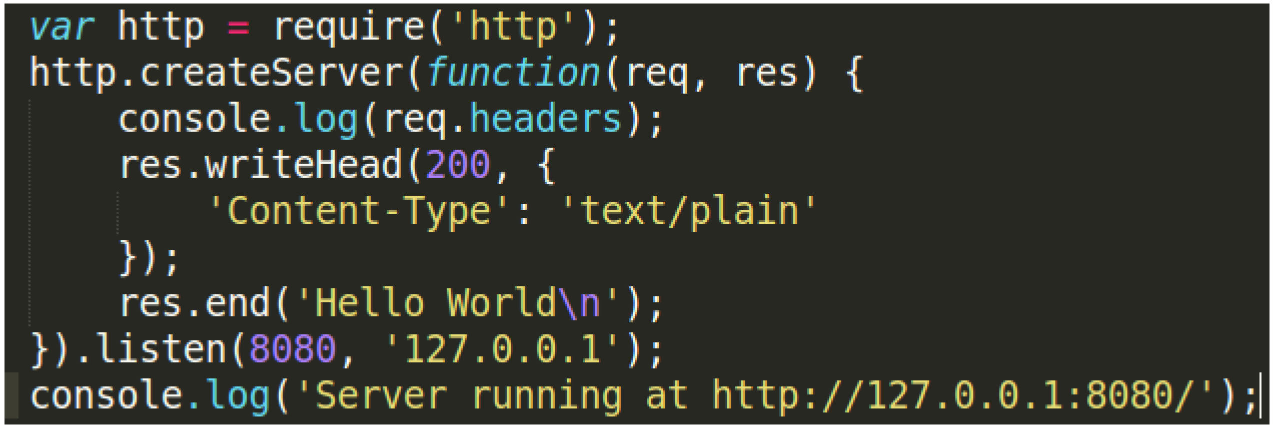
Node.js is a platform built on ***Chrome's JavaScript runtime*** for easily building fast, scalable network applications. Node.js uses an ***event-driven, non-blocking I/O model*** that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices.

How to install node

- Windows mac 用户直接下载 2 进制安装包即可 .
- 最新的 node 也有 linux (64 位) 二进制包 (预编译好的)
- Read the document!
- https://github.com/joyent/node/wiki/Installation

Http server

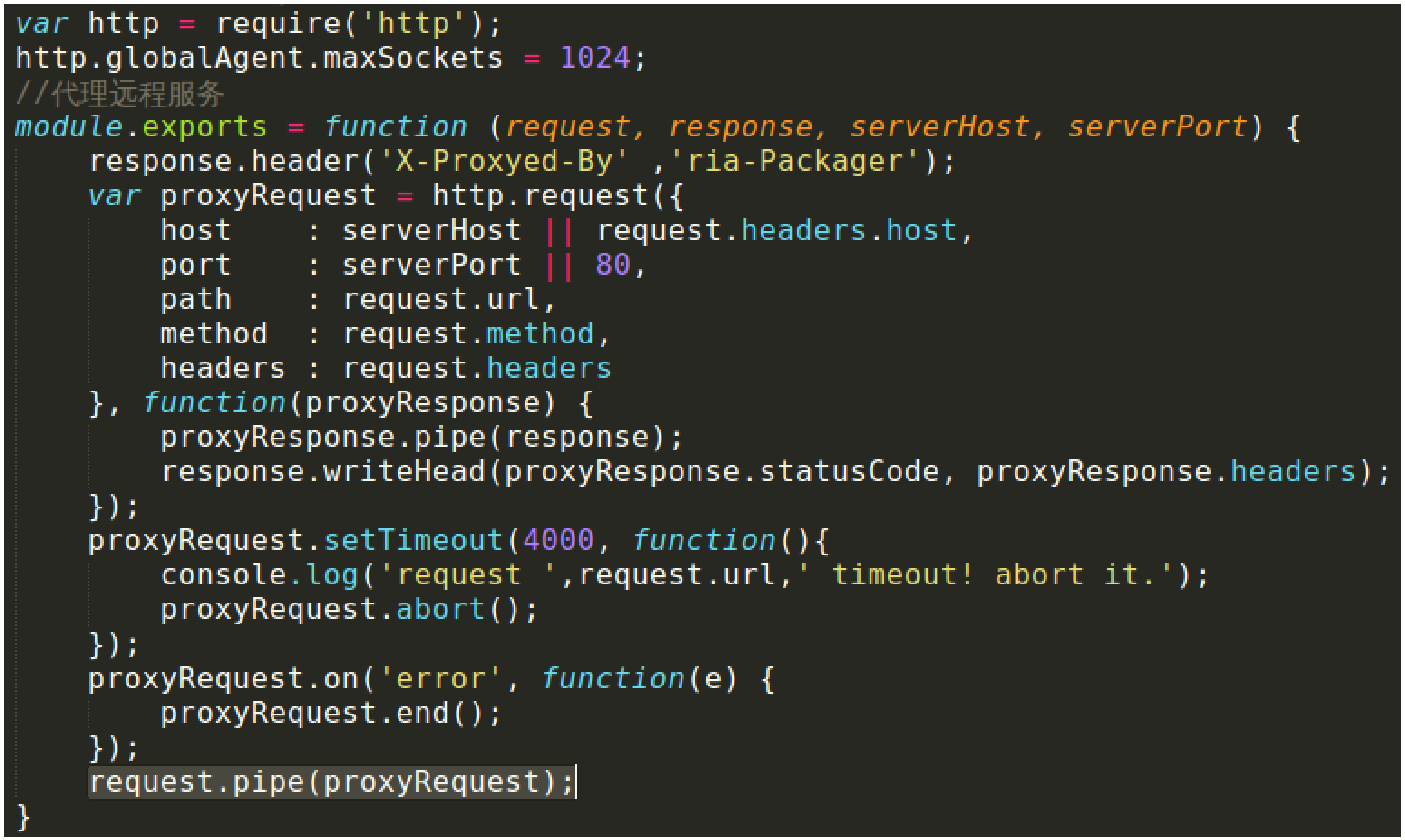
- A tiny http server



```
var http = require('http');
http.createServer(function(req, res) {
    console.log(req.headers);
    res.writeHead(200, {
        'Content-Type': 'text/plain'
    });
    res.end('Hello World\n');
}).listen(8080, '127.0.0.1');
console.log('Server running at http://127.0.0.1:8080/');
```

stream pipe

- http://nodejs.org/api/stream.html
- process.stdin.pipe(process.stdout);
- reader.pipe(writer);



```
var http = require('http');
http.globalAgent.maxSockets = 1024;
//代理远程服务
module.exports = function (request, response, serverHost, serverPort) {
    response.header('X-Proxyed-By' ,'ria-Packager');
    var proxyRequest = http.request({
        host    : serverHost || request.headers.host,
        port    : serverPort || 80,
        path    : request.url,
        method  : request.method,
        headers : request.headers
    }, function(proxyResponse) {
        proxyResponse.pipe(response);
        response.writeHead(proxyResponse.statusCode, proxyResponse.headers);
    });
    proxyRequest.setTimeout(4000, function(){
        console.log('request ',request.url,' timeout! abort it.');
        proxyRequest.abort();
    });
    proxyRequest.on('error', function(e) {
        proxyRequest.end();
    });
    request.pipe(proxyRequest);
}
```

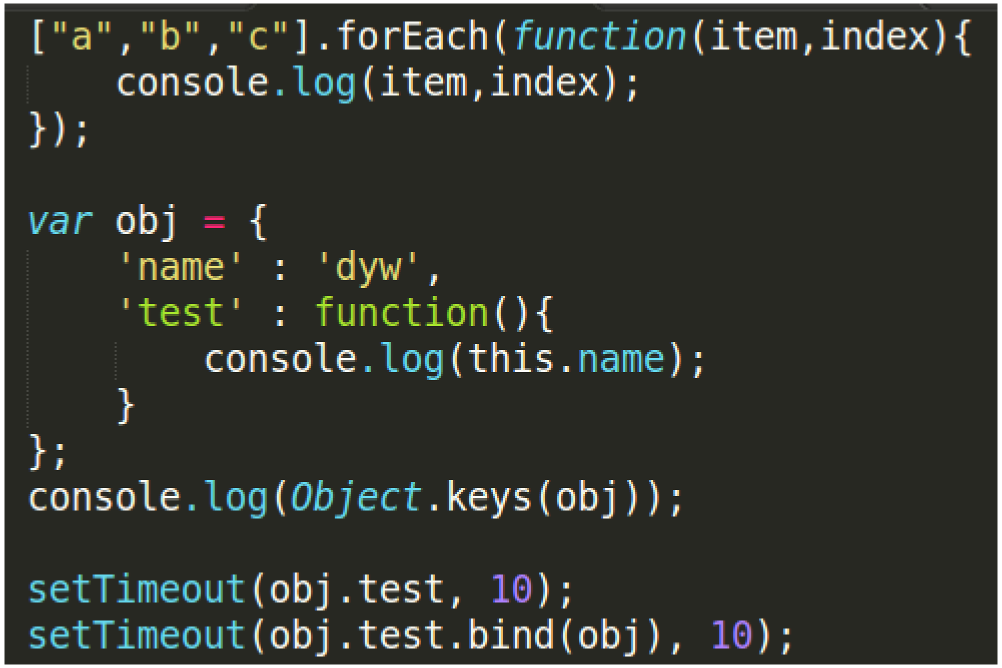
ECMA 5(6) Mozilla Features Implemented in V8

- 没有浏览器端开发要考虑那么多兼容性问题
- https://github.com/joyent/node/wiki/ECMA-5-Mozilla-Features-Implemented-in-V8

- http://dailyjs.com/2012/10/15/preparing-for-esnext/

ecma5

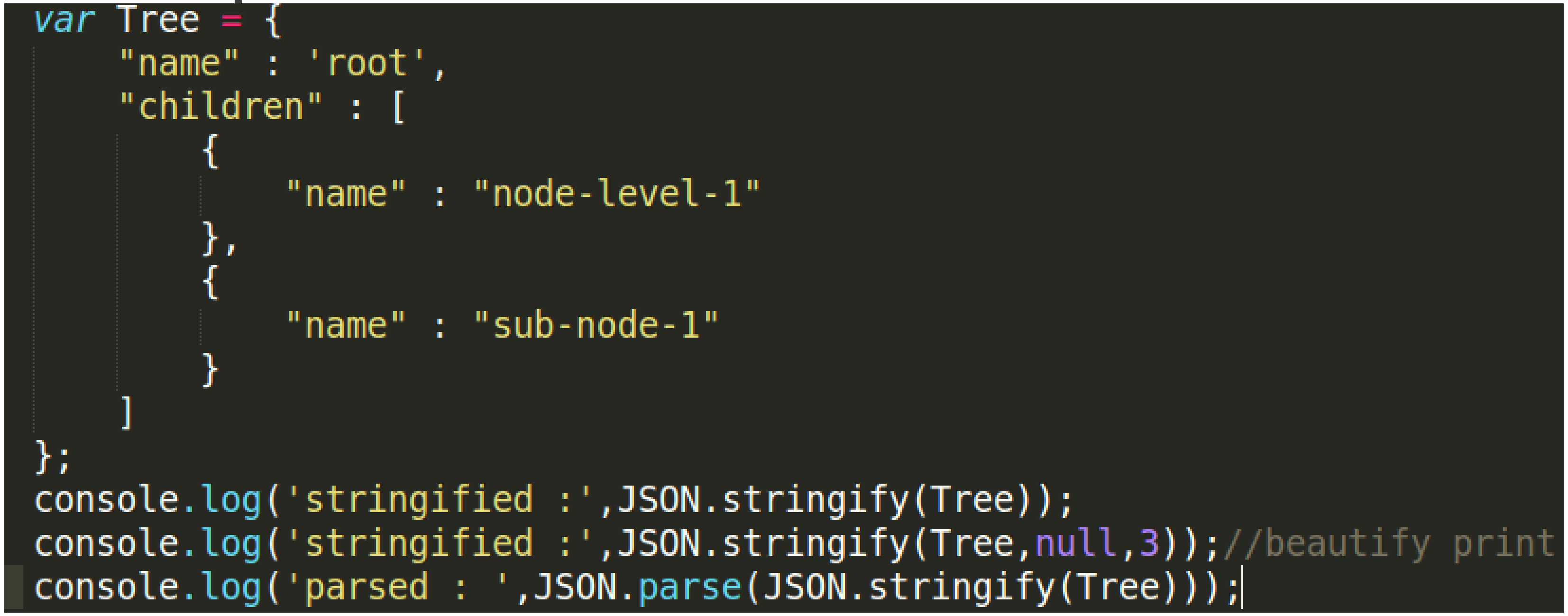
- [].forEach
- Object.keys
- Function.bind



```javascript
["a","b","c"].forEach(function(item,index){
    console.log(item,index);
});

var obj = {
    'name' : 'dyw',
    'test' : function(){
        console.log(this.name);
    }
};
console.log(Object.keys(obj));

setTimeout(obj.test, 10);
setTimeout(obj.test.bind(obj), 10);
```

JSON

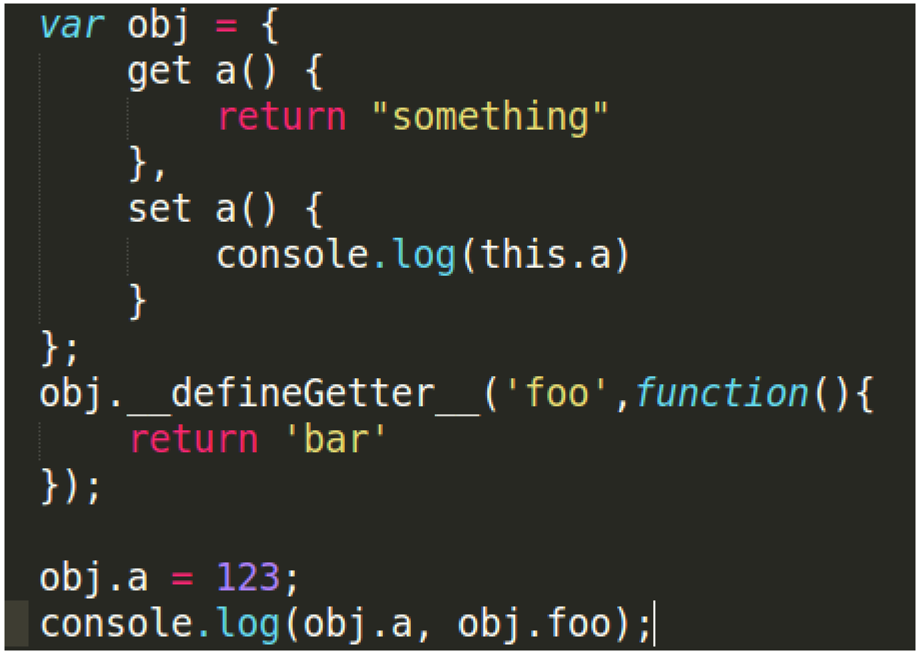
- JSON.stringify
- JSON.parse



```
var Tree = {
    "name" : 'root',
    "children" : [
        {
            "name" : "node-level-1"
        },
        {
            "name" : "sub-node-1"
        }
    ]
};
console.log('stringified :',JSON.stringify(Tree));
console.log('stringified :',JSON.stringify(Tree,null,3));//beautify print
console.log('parsed : ',JSON.parse(JSON.stringify(Tree)));
```

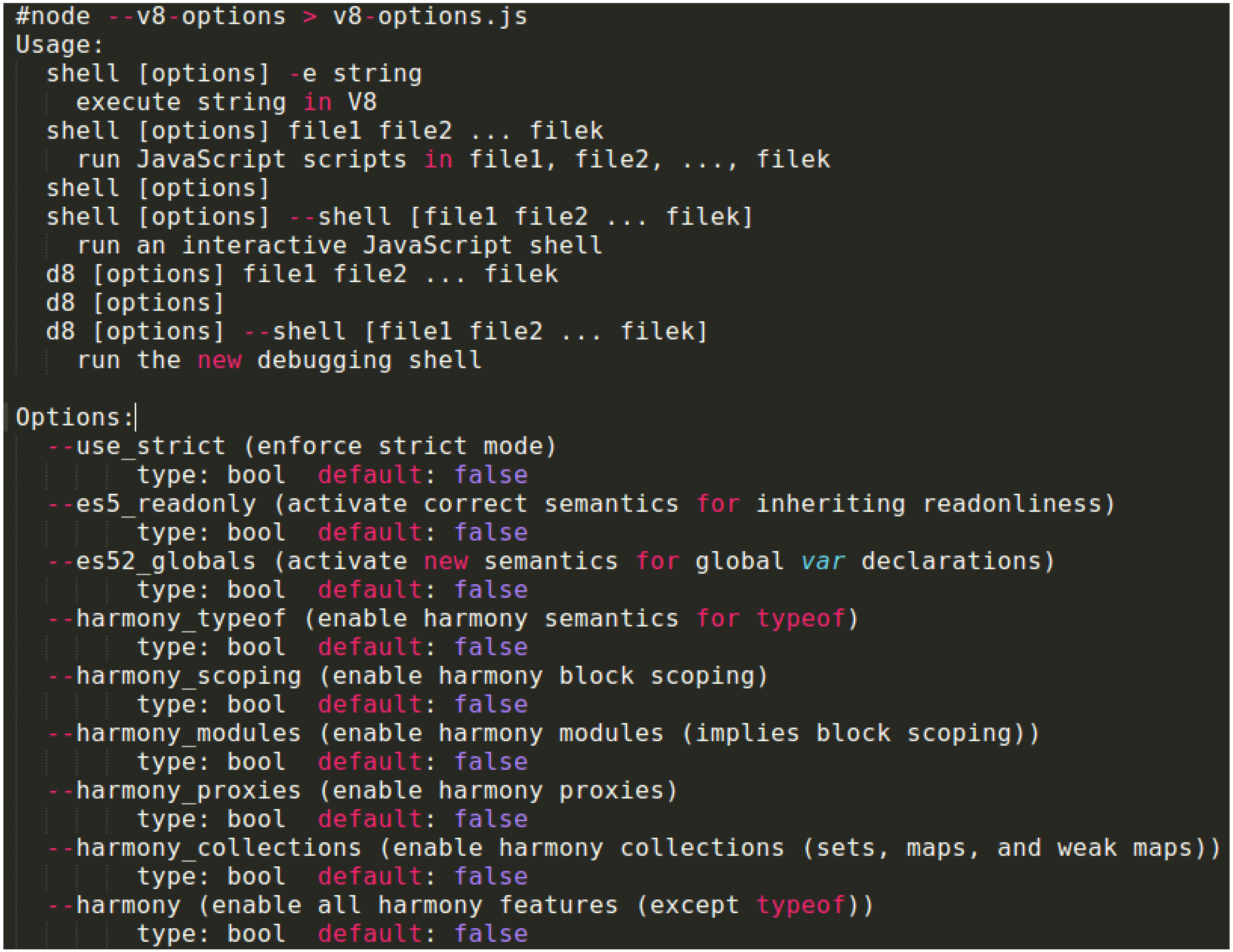
__defineGetter__

-
-



```
var obj = {
    get a() {
        return "something"
    },
    set a() {
        console.log(this.a)
    }
};
obj.__defineGetter__('foo',function(){
    return 'bar'
});

obj.a = 123;
console.log(obj.a, obj.foo);
```

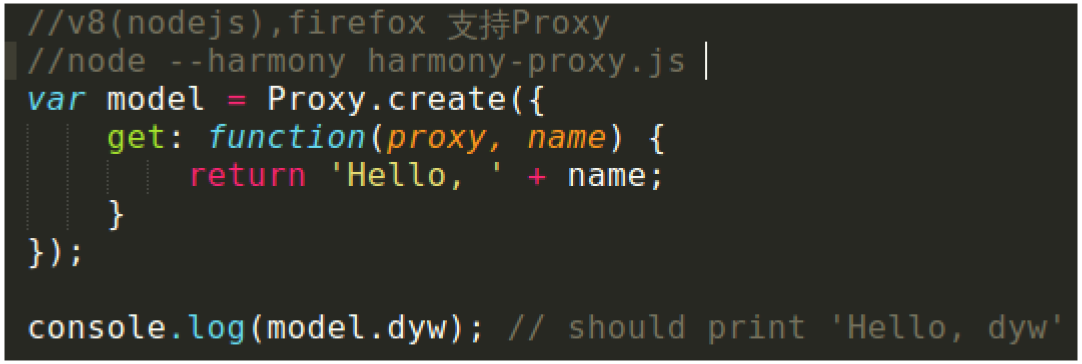
node --v8-options



```
#node --v8-options > v8-options.js
Usage:
  shell [options] -e string
    execute string in V8
  shell [options] file1 file2 ... filek
    run JavaScript scripts in file1, file2, ..., filek
  shell [options]
  shell [options] --shell [file1 file2 ... filek]
    run an interactive JavaScript shell
  d8 [options] file1 file2 ... filek
  d8 [options]
  d8 [options] --shell [file1 file2 ... filek]
    run the new debugging shell

Options:
  --use_strict (enforce strict mode)
        type: bool  default: false
  --es5_readonly (activate correct semantics for inheriting readonliness)
        type: bool  default: false
  --es52_globals (activate new semantics for global var declarations)
        type: bool  default: false
  --harmony_typeof (enable harmony semantics for typeof)
        type: bool  default: false
  --harmony_scoping (enable harmony block scoping)
        type: bool  default: false
  --harmony_modules (enable harmony modules (implies block scoping))
        type: bool  default: false
  --harmony_proxies (enable harmony proxies)
        type: bool  default: false
  --harmony_collections (enable harmony collections (sets, maps, and weak maps))
        type: bool  default: false
  --harmony (enable all harmony features (except typeof))
        type: bool  default: false
```

node --harmony_proxies(动态元编程)

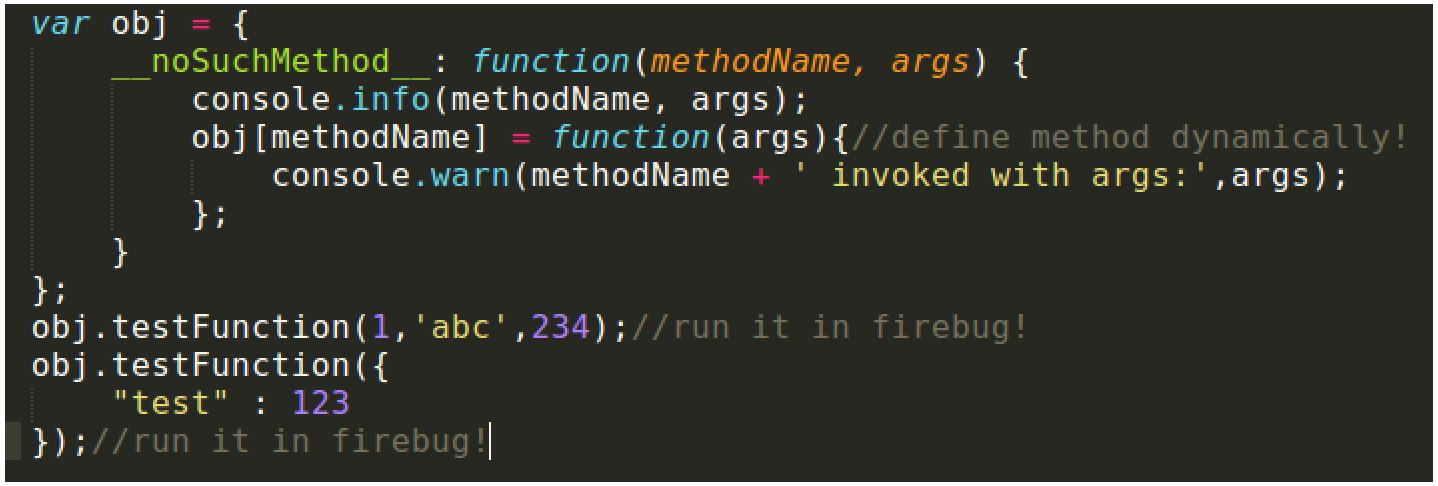
- node –harmony or node –harmony_proxies
- http://soft.vub.ac.be/~tvcutsem/invokedynamic/proxies_tutorial



```
//v8(nodejs),firefox 支持Proxy
//node --harmony harmony-proxy.js
var model = Proxy.create({
    get: function(proxy, name) {
        return 'Hello, ' + name;
    }
});

console.log(model.dyw); // should print 'Hello, dyw'
```

Spider monkey __noSuchMethod__

- __noSuchMethod__
- 仅 Firefox 浏览器支持



```
var obj = {
    __noSuchMethod__: function(methodName, args) {
        console.info(methodName, args);
        obj[methodName] = function(args){//define method dynamically!
            console.warn(methodName + ' invoked with args:',args);
        };
    }
};
obj.testFunction(1,'abc',234);//run it in firebug!
obj.testFunction({
    "test" : 123
});//run it in firebug!
```

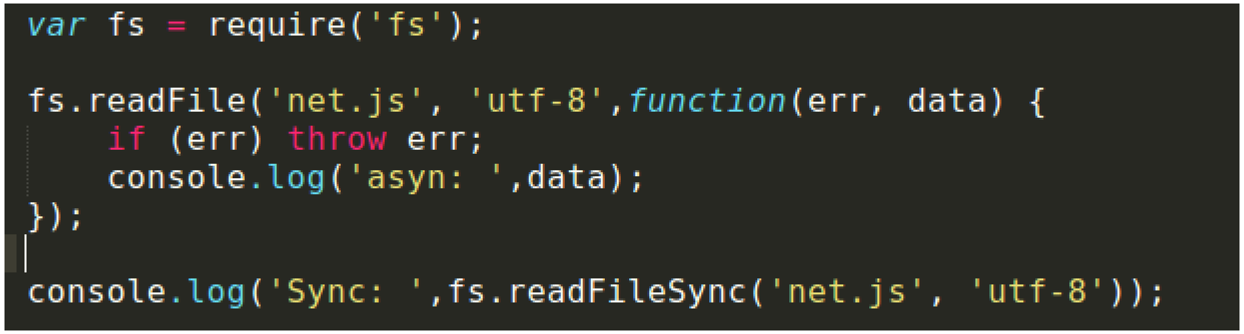
node-dev

- node test.js
- node-dev test.js // 监控 js 内容变化 , 即时重启 node

npm

- npm publish(npm adduser)
- npm install express -g
- npm update express -g
- **package.json**

异步 vs 同步

- fs.readFileSync('net.js', 'utf-8');
- fs.readFile('net.js', 'utf-8',function(err, data) {});
- nodejs 编程推荐都用异步方式 , 以保证无阻塞 .
- 

```
var fs = require('fs');

fs.readFile('net.js', 'utf-8',function(err, data) {
    if (err) throw err;
    console.log('asyn: ',data);
});

console.log('Sync: ',fs.readFileSync('net.js', 'utf-8'));
```

异步回调的嵌套陷阱

- promises

```
Parse.User.logIn("user", "pass", {
  success: function(user) {
    query.find({
      success: function(results) {
        results[0].save({ key: value }, {
          success: function(result) {
            // the object was saved.
          }
        });
      }
    });
  }
});
```

```
Parse.User.logIn("user", "pass").then(function(user) {
  return query.find();
}).then(function(results) {
  return results[0].save({ key: value });
}).then(function(result) {
  // the object was saved.
});
```

使用 promise 解决回调嵌套

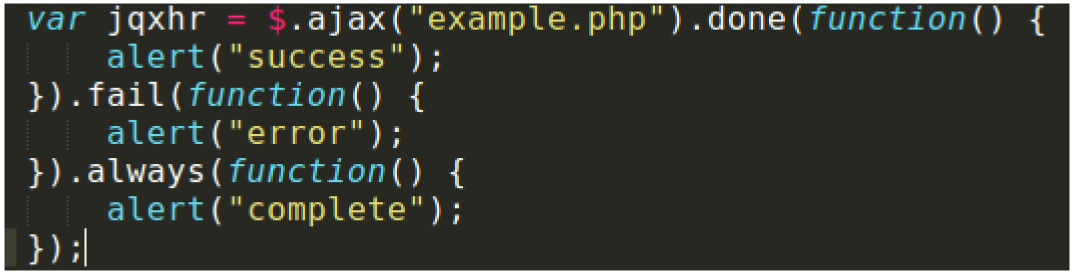
- promise

```
Parse.User.logIn("user", "pass", {
  success: function(user) {
    query.find({
      success: function(results) {
        results[0].save({ key: value }, {
          success: function(result) {
            // the object was saved.
          },
          error: function(result, error) {
            // An error occurred.
          }
        });
      },
      error: function(error) {
        // An error occurred.
      }
    });
  },
  error: function(user, error) {
    // An error occurred.
  }
});
```

```
Parse.User.logIn("user", "pass").then(function(user) {
  return query.find();
}).then(function(results) {
  return results[0].save({ key: value });
}).then(function(result) {
  // the object was saved.
}, function(error) {
  // there was some error.
});
```

jQuery Promise

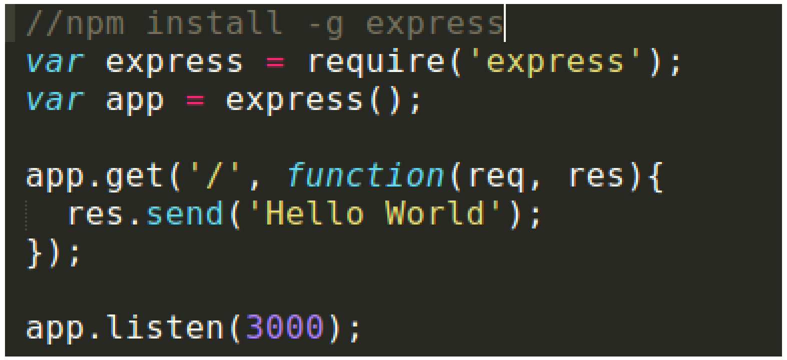
- http://api.jquery.com/jQuery.ajax/
- The jqXHR objects returned by $.ajax() as of jQuery 1.5 implement the Promise interface, giving them all the properties, methods, and behavior of a Promise (see Deferred object for more information).



```
var jqxhr = $.ajax("example.php").done(function() {
    alert("success");
}).fail(function() {
    alert("error");
}).always(function() {
    alert("complete");
});
```

Express web framework

- **Sinatra inspired** web development framework for node.js -- insanely fast, flexible, and simple
- Built on ***Connect*** Middleware
- http://expressjs.com
- npm install -g express
- Read the doc!!



```
//npm install -g express
var express = require('express');
var app = express();

app.get('/', function(req, res){
  res.send('Hello World');
});

app.listen(3000);
```

What Express Does

- Parses arguments and headers
- Routing
- Views
- Partials
- Layouts
- Configuration
- Sessions

Request Object

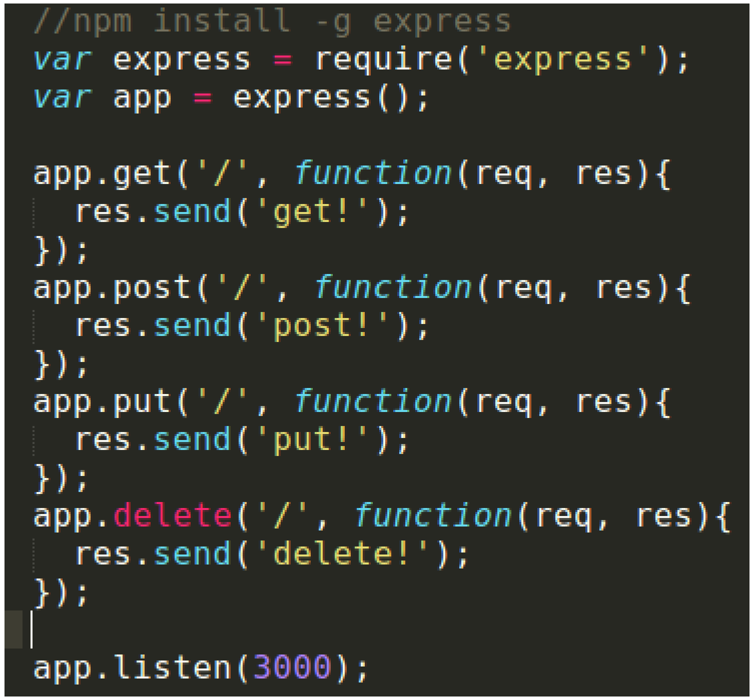
- req.param
- req.query
- req.body
- Req.files
- req.flash ---- show error msg
- req.session , req.cookies express.cookieParser;
- req.headers

Response Object

- res.redirect
- res.write ---Transfer-Encoding:**chunked**
- res.end
- res.download res.sendfile res.attachment
- res.send
- res.status
- res.json res.jsonp
- res.format res.render

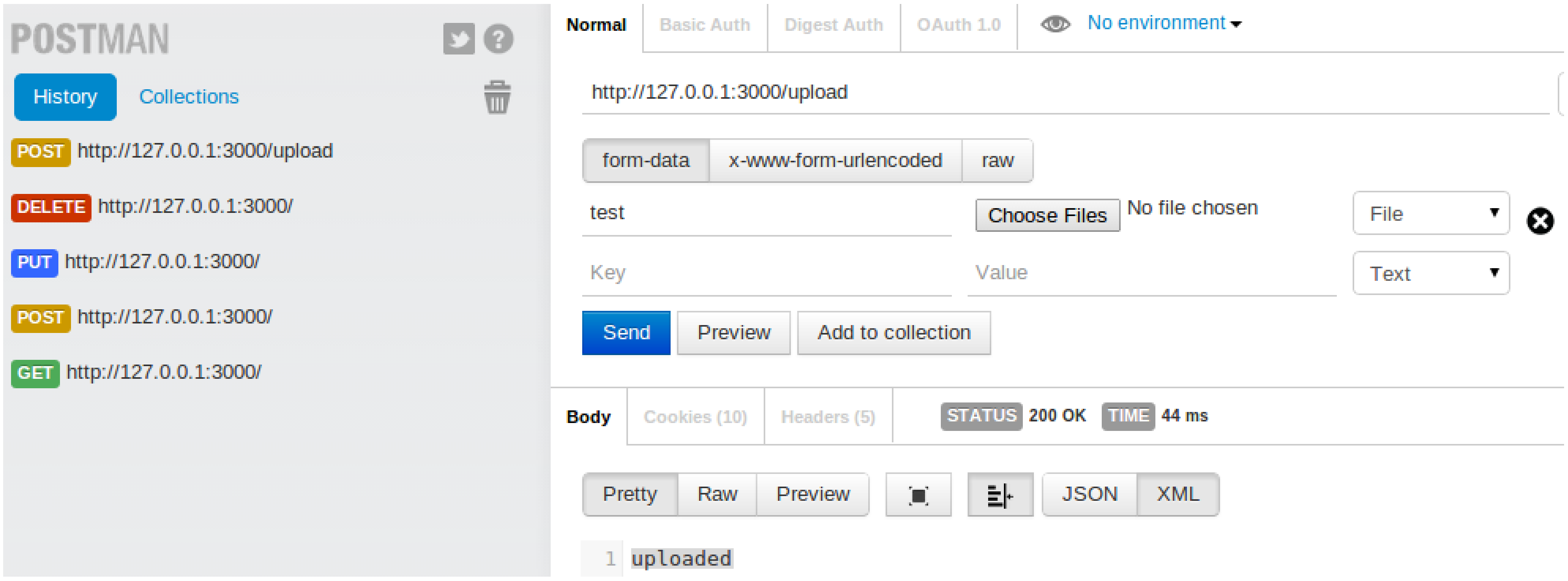
express--CRUD

- CRUD <---> HTTP Get,Post,Put,Delete
- restful



```
//npm install -g express
var express = require('express');
var app = express();

app.get('/', function(req, res){
  res.send('get!');
});
app.post('/', function(req, res){
  res.send('post!');
});
app.put('/', function(req, res){
  res.send('put!');
});
app.delete('/', function(req, res){
  res.send('delete!');
});

app.listen(3000);
```

Get-Post-Put-Delete



POST http://127.0.0.1:3000/upload

DELETE http://127.0.0.1:3000/

PUT http://127.0.0.1:3000/

POST http://127.0.0.1:3000/

GET http://127.0.0.1:3000/

http://127.0.0.1:3000/upload

test — Choose Files No file chosen — File

Key — Value — Text

STATUS 200 OK TIME 44 ms

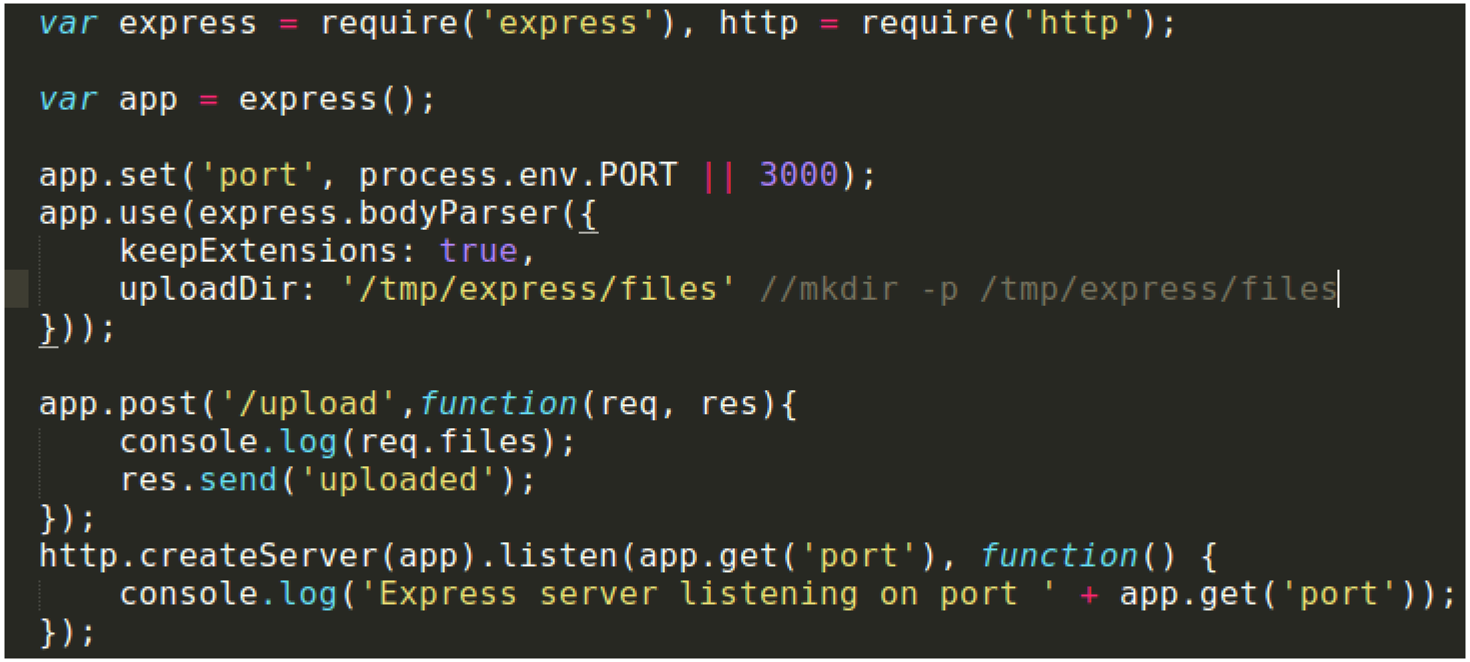
```
uploaded
```

express.methodOverride

- <input type="hidden" name="**_method**" value="delete"/> 附加参数 _method.
- app.use(express.bodyParser());
- app.use(express.methodOverride());
- jQuery.ajax() 通过 type 参数支持 http PUT 及 DELETE 方法 (部分浏览器 XMLHttpRequest 对象支持 put,delete 方法)

express—file upload

- app.use(express.bodyParser)
- https://github.com/felixge/node-formidable



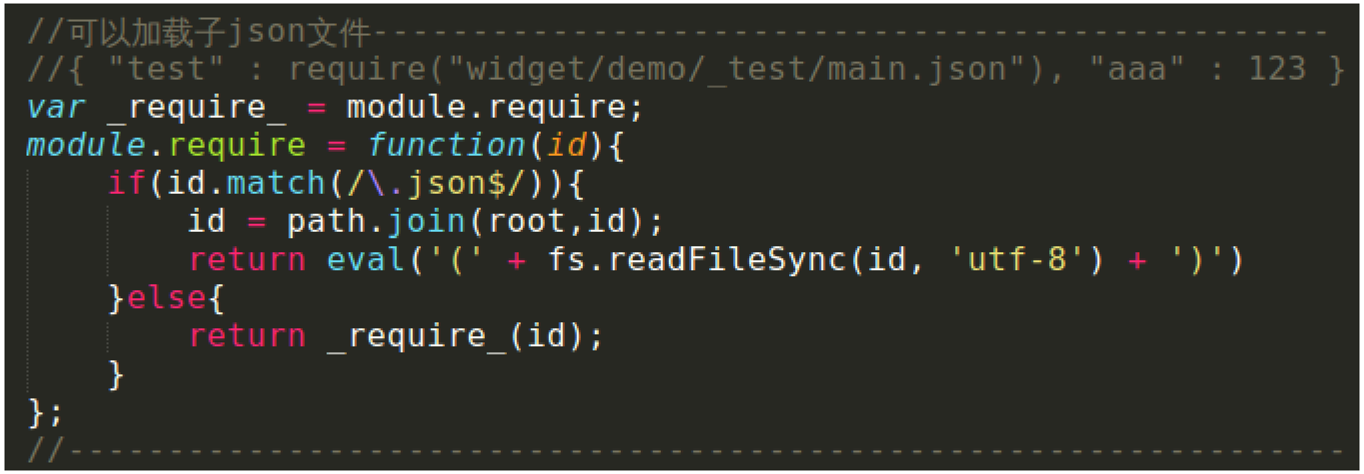
```
var express = require('express'), http = require('http');

var app = express();

app.set('port', process.env.PORT || 3000);
app.use(express.bodyParser({
    keepExtensions: true,
    uploadDir: '/tmp/express/files' //mkdir -p /tmp/express/files
}));

app.post('/upload',function(req, res){
    console.log(req.files);
    res.send('uploaded');
});
http.createServer(app).listen(app.get('port'), function() {
    console.log('Express server listening on port ' + app.get('port'));
});
```

ria-packager 开发中遇到的部分问题及解决方案

- require('a/b/c/_test/main.json');
- less 中背景图片 url 处理 (相对路径调整 , 加 md5 版本号)
- Mustache 模板渲染
- 进程管理
- 在线打包 , 实时输出 log 日志到浏览器

按需加载模板数据

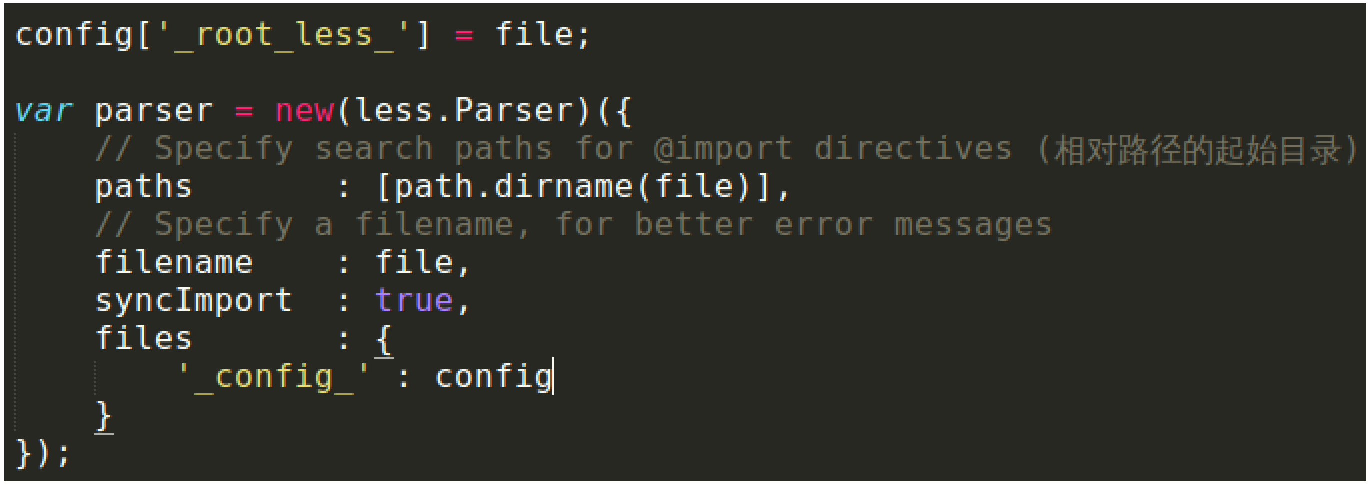
- require('a/b/c/_test/main.json');
- 使用 eval 解析 json
- 重载 require.



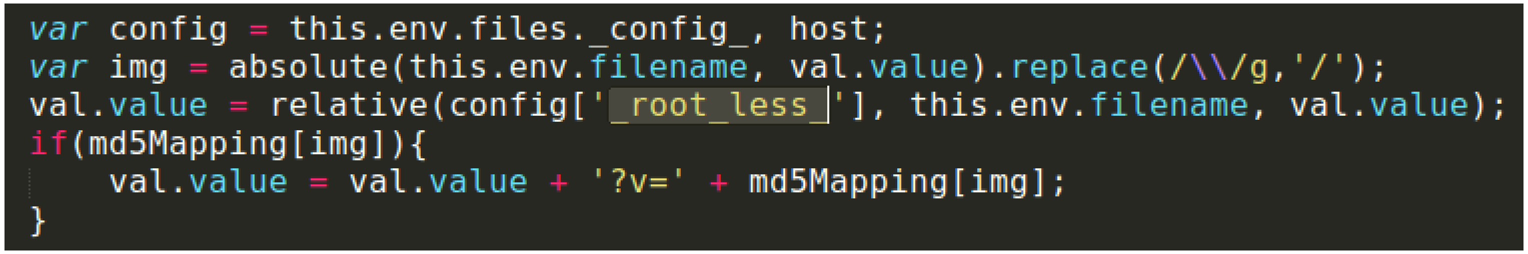
```
//可以加载子json文件-----------------------------------------
//{ "test" : require("widget/demo/_test/main.json"), "aaa" : 123 }
var _require_ = module.require;
module.require = function(id){
    if(id.match(/\.json$/)){
        id = path.join(root,id);
        return eval('(' + fs.readFileSync(id, 'utf-8') + ')')
    }else{
        return _require_(id);
    }
};
//------------------------------------------------------------
```

less 中背景图片 url 处理

- path.relative
- 打包时先 copy 所有图片，并计算其 md5 hash.



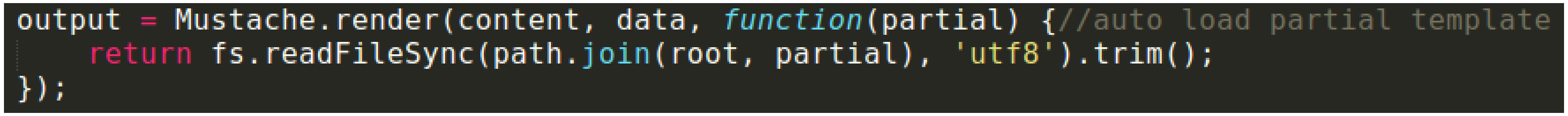
```
config['_root_less_'] = file;

var parser = new(less.Parser)({
    // Specify search paths for @import directives (相对路径的起始目录)
    paths        : [path.dirname(file)],
    // Specify a filename, for better error messages
    filename     : file,
    syncImport   : true,
    files        : {
        '_config_' : config
    }
});
```



```
var config = this.env.files._config_, host;
var img = absolute(this.env.filename, val.value).replace(/\\/g,'/');
val.value = relative(config['_root_less_'], this.env.filename, val.value);
if(md5Mapping[img]){
    val.value = val.value + '?v=' + md5Mapping[img];
}
```

mustache 模板渲染

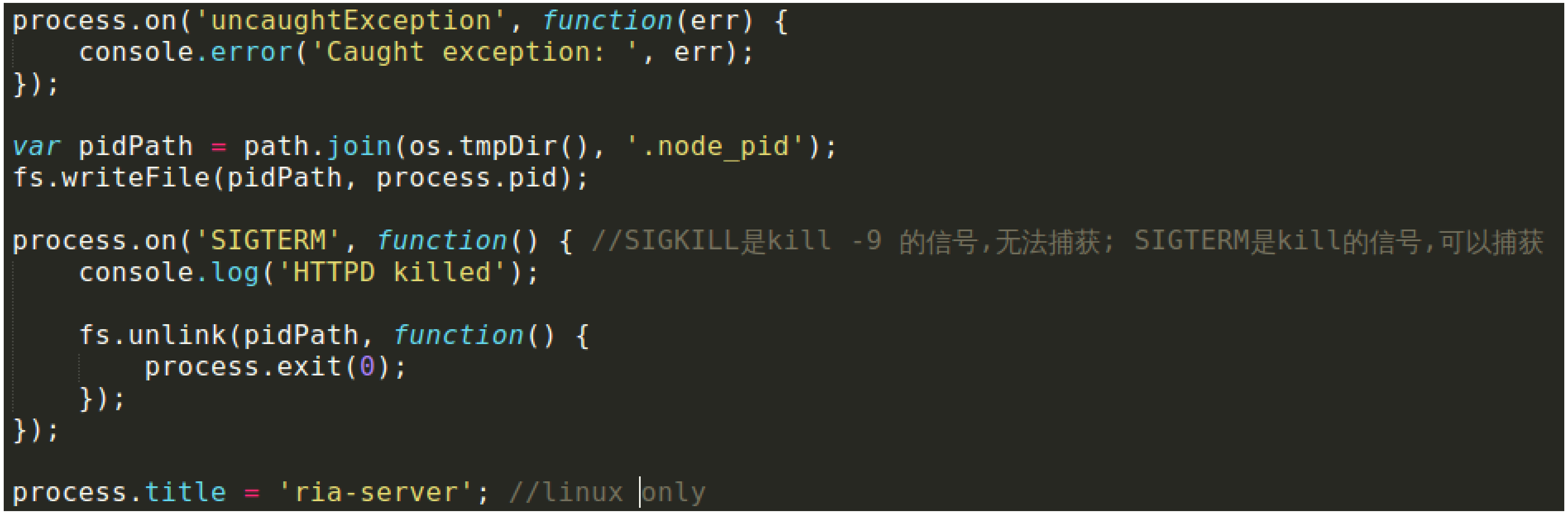
- 清除模板缓存 mustache.clearCache();
- 加载子模板：



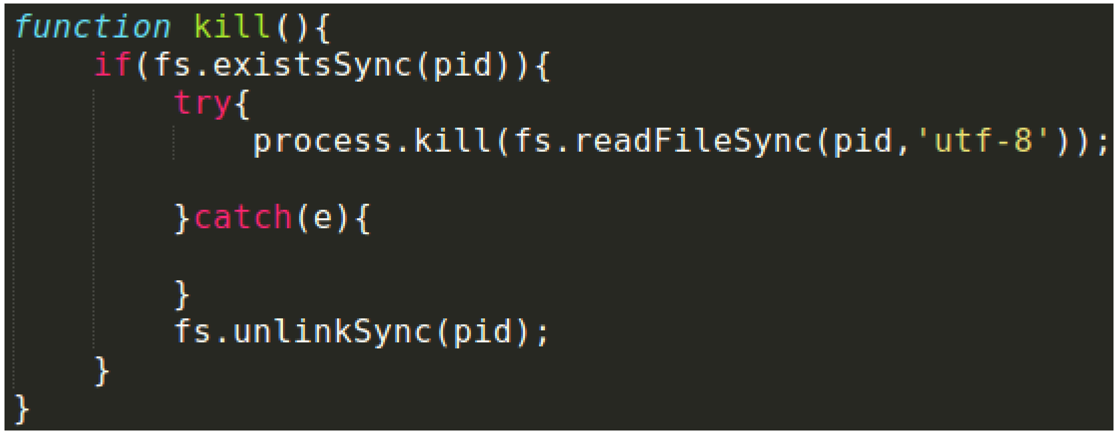
```
output = Mustache.render(content, data, function(partial) {//auto load partial template
    return fs.readFileSync(path.join(root, partial), 'utf8').trim();
});
```

进程管理

- process.pid



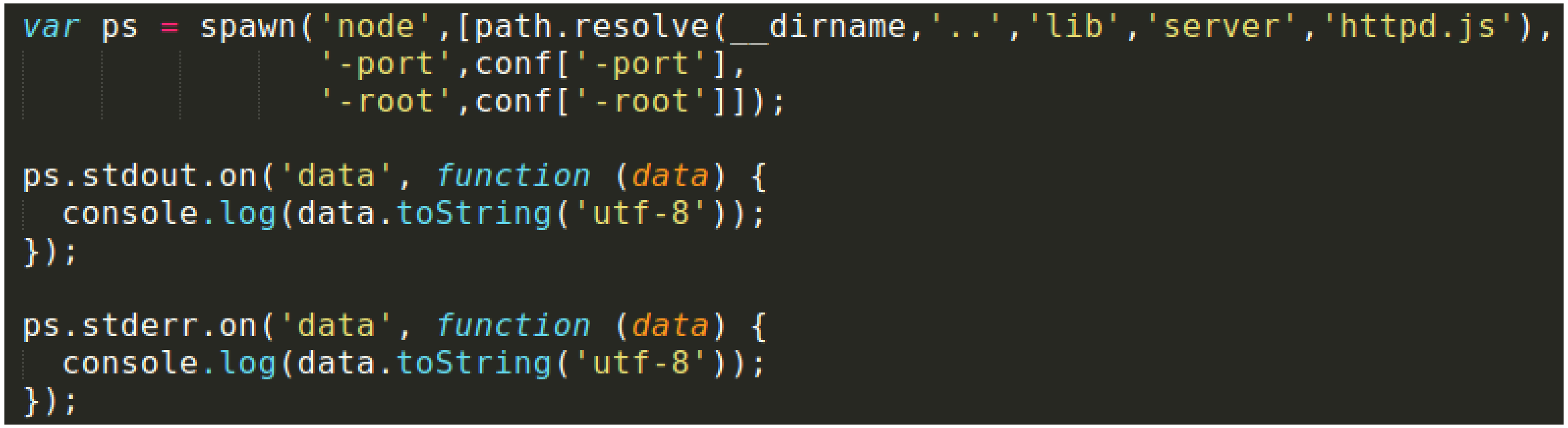
```
process.on('uncaughtException', function(err) {
    console.error('Caught exception: ', err);
});

var pidPath = path.join(os.tmpDir(), '.node_pid');
fs.writeFile(pidPath, process.pid);

process.on('SIGTERM', function() { //SIGKILL是kill -9 的信号,无法捕获; SIGTERM是kill的信号,可以捕获
    console.log('HTTPD killed');

    fs.unlink(pidPath, function() {
        process.exit(0);
    });
});

process.title = 'ria-server'; //linux only
```



```
function kill(){
    if(fs.existsSync(pid)){
        try{
            process.kill(fs.readFileSync(pid,'utf-8'));

        }catch(e){

        }
        fs.unlinkSync(pid);
    }
}
```

spawn 进程

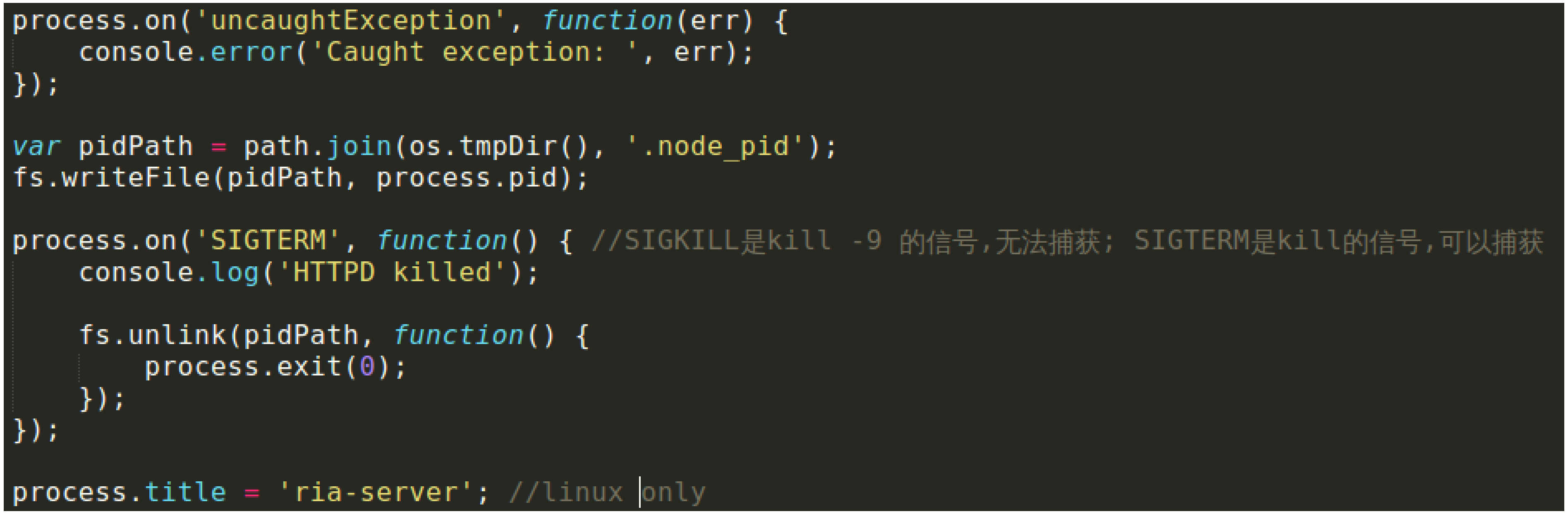
- Spawn or fork(clone) or exe



```
var ps = spawn('node',[path.resolve(__dirname,'..','lib','server','httpd.js'),
                      '-port',conf['-port'],
                      '-root',conf['-root']]);

ps.stdout.on('data', function (data) {
  console.log(data.toString('utf-8'));
});

ps.stderr.on('data', function (data) {
  console.log(data.toString('utf-8'));
});
```

信号处理

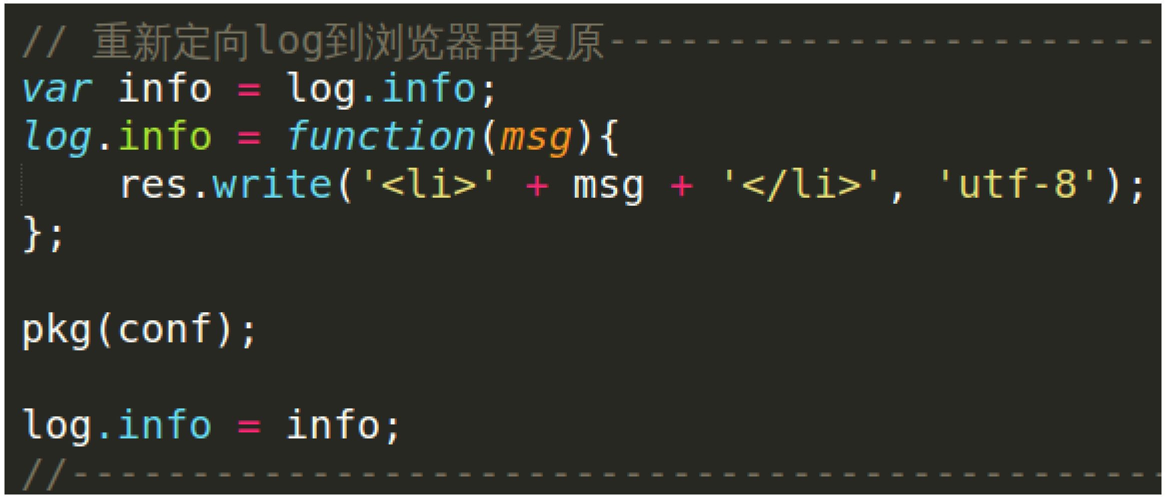
- SIGTERM , SIGKILL,... 软重启 .
- process.exit(0||1); 0 成功 ,1 出错 .



```
process.on('uncaughtException', function(err) {
    console.error('Caught exception: ', err);
});

var pidPath = path.join(os.tmpDir(), '.node_pid');
fs.writeFile(pidPath, process.pid);

process.on('SIGTERM', function() { //SIGKILL是kill -9 的信号,无法捕获; SIGTERM是kill的信号,可以捕获
    console.log('HTTPD killed');

    fs.unlink(pidPath, function() {
        process.exit(0);
    });
});

process.title = 'ria-server'; //linux only
```

在线打包工程

- 实时输出 log 日志到浏览器
- http://192.168.66.211:8888/mobile/deploy



```
// 重新定向log到浏览器再复原-----------------------
var info = log.info;
log.info = function(msg){
    res.write('<li>' + msg + '</li>', 'utf-8');
};

pkg(conf);

log.info = info;
//---------------------------------------------
```

The end

- Q & A?