

# Building Nuclide @ Facebook

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扫码报名

# SPEAKER INTRODUCE

## 黄力菲 Engineering Manager

- 黄力菲(Leo Huang)：现在Facebook任Engineering Manager。2010年至今在Facebook带领团队开发了开源开发工具Nuclide，以及代码审核工具Phabricator。目前主管产品性能测试工具和平台的开发。2002-2010在微软从事Visual Studio，SQL Server引擎和智能个人设备的开发工作。毕业于清华大学自动化系，在美国俄亥俄州立大学计算机系获硕士学位。



# SPEAKER INTRODUCE

谭映辉 Software Engineer

- 谭映辉(Jeffrey Tan) : Facebook开发工具资深专家。2009-2015 就职于美国Microsoft总部从事 Visual Studio Debugger的开发工作。2015-2017 就职于Facebook , 从事代码审核工具Phabricator的开发 , 后加入开源开发工具Nuclide的开发 , 主管编译器和调试器相关领域。毕业于复旦大学数学系。

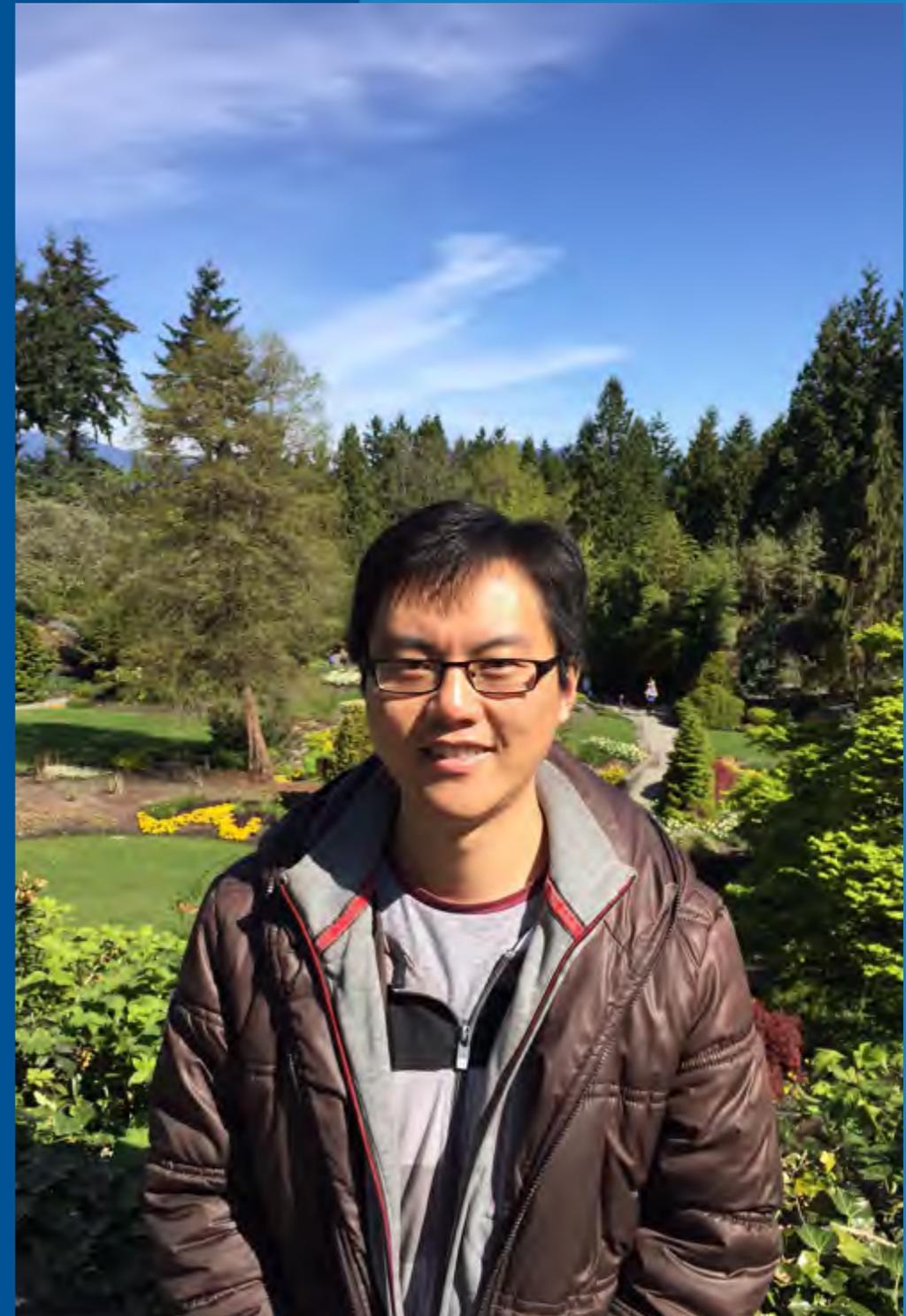


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- **Introduction and History**
- Architecture
- Innovations
- Remote Development

# Introduction



“A unified developer experience for web and mobile development”

# Nuclide

```
16  */
17  'use strict';
18
19  var React = require('react');
20  var ReactNative = require('react-native');
21  var {
22    AppRegistry,
23    StyleSheet,
24    Text,
25    TouchableHighlight,
26    View,
27  } = ReactNative;
28
29  class Board {
30    grid: Array<Array<number>>;
31    turn: number;
32
33    constructor() {
34      var size = 3;
35      var grid = Array(size);
36      for (var i = 0; i < size; i++) {
37        var row = Array(size);
38        for (var j = 0; j < size; j++) {
39          row[j] = 0;
40        }
41        grid[i] = row;
42      }
43      this.grid = grid;
44
45      this.turn = 1;
46    }
47
48  }
49
50  class Cell {
51    cellStyle=()
52    textStyle=()
53    textContents=()
54    render()
55  }
56
57  class GameEndOverlay {
58    render()
59  }
60
61  var TicTacToeApp
62  var styles
```

# One IDE to Rule Them All

- Platforms
  - iOS, Android, Web, React Native
- Supported Languages
  - PHP/Hack, JS/Flow, Objective-C, C++, Python, OCaml, GraphQL

# Features

- OSS
- Remote development
- Source control integration (Git, Mercurial)
- Buck integration
- Debugger
- More

# History – Before Nuclide

- 2013-2014 Web IDE
  - Target: web development
  - Zero install
  - Cross-platform
  - Web for web
  - Remote development as the first citizen
  - Cons: security was a challenge.

arcanist - IDE Messenger

ArcanistDifferentialComr change1

- breakout.py
- php\_extension\_classes.txt
- php\_extension\_functions.txt
- phutil\_rebuild\_map.php
- phutil\_symbols.php
- update\_compat\_info.php
- write\_version\_file.php
- src
  - configuration
  - difference
  - differential
    - constants
      - ArcanistDifferentialCommitMess
      - ArcanistDifferentialCommitMess
      - ArcanistDifferentialDependency
    - docs
    - events
    - exception
    - extensions
    - hgdaemon
    - infrastructure
    - lint
    - parser
    - releeph
    - repository
    - sandcastle
    - unit
    - util
    - workflow
    - workingcopyidentity
    - \_\_phutil\_library\_init\_\_.php
    - \_\_phutil\_library\_map\_\_.php
  - LICENSE
  - NOTICE

```
22 public function getConduit(ConduitInterface $conduit) {
23     $this->conduit = $conduit;
24     return $this;
25 }
26
27 public function getConduit() {
28     return $this->conduit;
29 }
30
31 protected function loadEdges(array $nodes) {
32     $repository_api = $this->getRepositoryAPI();
33
34     $dependencies = $this->getConduit()->callMethodSynchronous(
35         'differential.query',
36         array(
37             'phids' => $nodes,
38         ));
39
40     $edges = array();
41     foreach ($dependencies as $dependency) {
42         $dependency_revision = $this->getCommitHashFromDict($dependency);
43         if ($repository_api->hasLocalCommit($dependency_revision)) {
44             $edges[$dependency['phid']] = array();
45             continue;
46         }
47         $auxillary = idx($dependency, 'auxiliary', array());
48         $edges[$dependency['phid']] = idx(
49             $auxillary,
50             'phabricator:depends-on',
51             array());
52     }
53     return $edges;
54 }
55
56 private function getCommitHashFromDict($dict) {
57     $api = $this->getRepositoryAPI();
58     $hashes = idx($dict, 'hashes', array());
59     if ($api instanceof ArcanistGitAPI) {
60         $key = ArcanistDifferentialRevisionHash::HASH_GIT_COMMIT;
61     } else if ($api instanceof ArcanistMercurialAPI) {
62         $key = ArcanistDifferentialRevisionHash::HASH_MERCURIAL_COMMIT;
63     } else {
64         $key = null;
65     }
66     return idx($hashes, $key);
67 }
68
69 }
70
71 }
72 }
```

src/differential/ArcanistDifferentialDependencyGraph.php 60 : 45

Show uncommitted files only Errors (0) Test Search Results (0) Hack Terminal Debugger Console COMMIT DIFF LAND

# History – Birth of Nuclide

- In 2014-2015, Facebook became a mobile first company.
- IntelliJ and Xcode did not scale for us.

# History - Nuclide

- Nuclide! Desktop IDE based on Atom
  - OSS
  - Familiar web technology and fast development cycle
  - Growing package ecosystem
  - Extensibility as first citizen
- Decision: merge the force, build feature parity on Nuclide

# Development of Nuclide

- Core teams
  - MPK: UI, Android
  - Seattle: debugger, languages, source control
- Contributors
  - Hack team, Flow team, GraphQL, etc.
  - Anybody can contribute to Nuclide, even an intern.

# Why Nuclide for Facebook

- What's special about Facebook?
  - Remote development
  - Multiple languages/projects in daily development

# Why Nuclide for Facebook

- One IDE to rule them all.
- Open platform.
- Tailored for Facebook. Deep integration with Facebook tool chain.
- Remote development.

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- Introduction and History
- **Architecture**
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# Architecture

- Design Principles
- Electron vs Atom vs Nuclide
- Language services
- Debugger
- Nuclide Remoting Framework
- Technologies Stack(Skim)

# Design Principles

- Cross platform
- Remote development
- Extensibility as first citizen
- Repo vs Project: impacts search, scalability from beginning

# Architecture Overview

## Nuclide

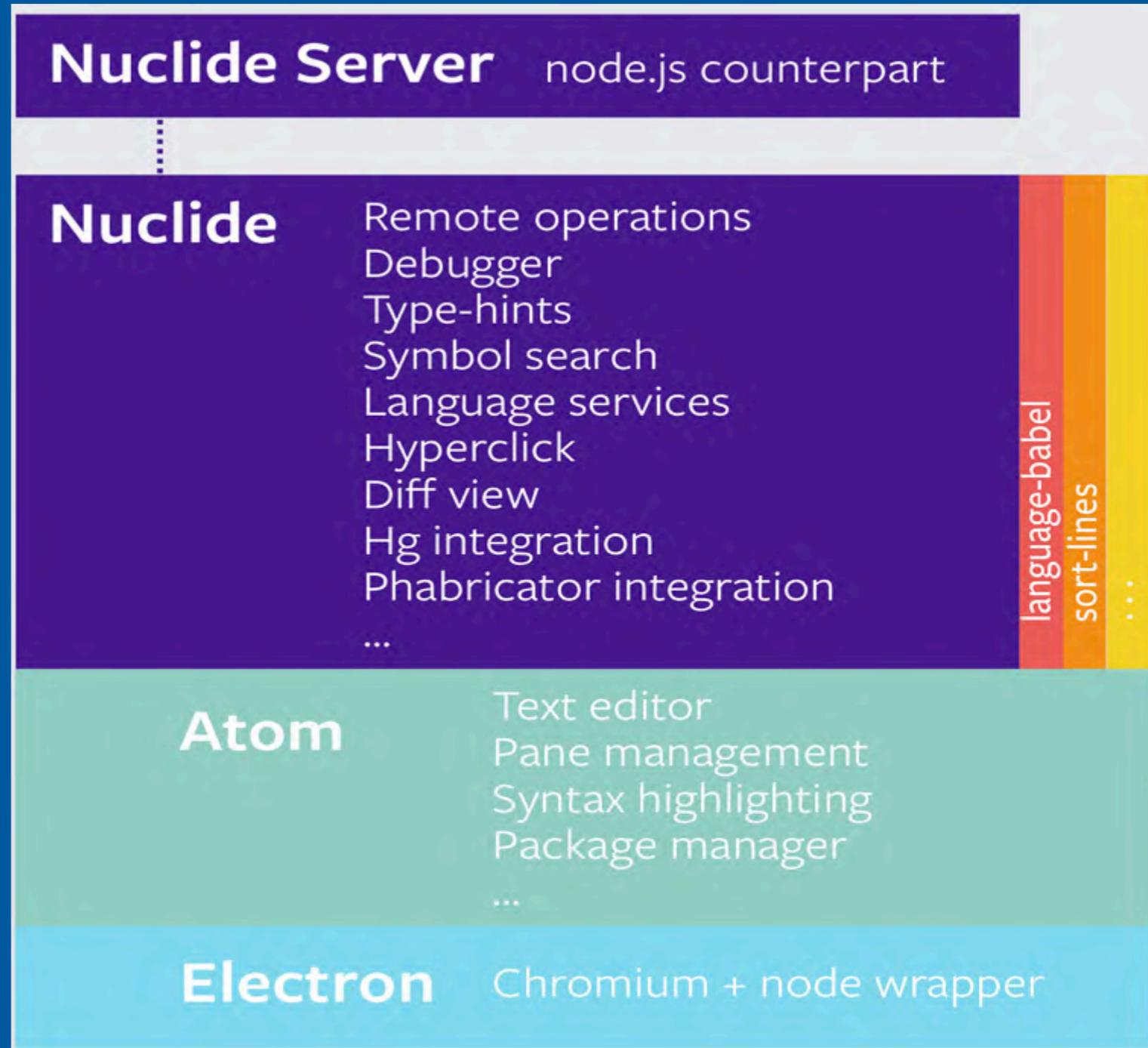
Atom package providing IDE features

## Atom

Extensible editor based on Electron

## Electron

Framework for building native application with web technologies



# Language Services

## Features

- AutoCompletion, Go To Definition, Type Hint, Type Coverage.
- Context View, Outline view
- Type Checking Diagnostics
- On fly type checking without saving.

## Support Languages

- Php/Hack
- C++
- JS/Flow
- Python
- Others(Swift, GraphQL, Ocaml etc...)

## Different from compiler

- Compiler normally run once against static files on disk
- Language service does type checking frequently against dynamic file content in memory buffer(editor)
- Challenge: including the entire file contents in each language service request would be extremely inefficient

## Extensibility

- Every easy to plugin a new language(One intern adds the Python language support in 2 months)
- VSCode protocol compatible plugin

# Autocomplete

```
85     return self::getIndex()[$product][$guide]->key
86 }
87
88 public static function getFileForSummary(
89     string $product,
90     string $guide,
91 ): string {
92     $summaries = self::getSummaries();
93     invariant(
94         $summaries->containsKey($product),
95         'Product %s does not exist',
96         $product,
97     );
98     invariant(
```

```
keys()           function(): Vect...
containsKey($k)  function<Tu>( $k...
differenceByKey($traversable)
filterWithKey($callback)  function((functi...
firstKey()       function(): ?Tk
lastKey()        function(): ?Tk
mapWithKey($callback)  function<Tu>((fu...
removeKey($k)    function(Tk $k):...
toKeysArray()
```

# Diagnostics

```
76     no guides for %s ,
77     $product,
78 );
79 invariant(
80     $index[$product]->containsKey($guide),
81     '%s does not contain a %s guide',
82     $product,
83     $guide,
84 );
85 return self::getIndex()[$product][$guide]->keys()->toVector();
86 }
87
88 public static function getFileForSummary(
89     string $product,
90     string $guide,
91 ): string {
92     $summaries = self::getSummaries();
93     invariant(
94         $summaries->containsKey($product),
95         'Product %s does not exist',
96         $product,
97     );
```

Errors: 1 Warnings: 0  Show only diagnostics for current file

Use  to toggle this panel. 

Type	Source	Description	File	Line
<b>Error</b>	Hack	Invalid return type This is an object of type ImmVector It is incompatible with an object of type Vector	src/GuidesIndex.php	85

# Type Hint

```
public static function getProductIndex(  
    GuidesProduct $product,  
) : Map<string, Map<string, string>> {  
    $index = self::getIndex();  
    Map<HHVM\UserDocumentation\GuidesProduct, Map<string, Map<string, string>>>  
        $index->containsKey($product),  
        '%s is not in the guide index',  
        $product,  
    );  
    return $index[$product];  
}
```

# Context View

The screenshot shows the Xcode IDE with two panes. The left pane is the code editor for 'ViewController.m', and the right pane is the 'Context View' for the selected method.

```
2 / ViewController.m
3 / buck4
4 /
5 / Created by Elizabeth Borchardt on 10/11/16.
6 / Copyright © 2016 Elizabeth Borchardt. All rights reserved.
7 /
8
9 import "ViewController.h"
10
11 interface ViewController ()
12 @property (nonatomic) IBOutlet UILabel *timerLabel;
13 @property (nonatomic) IBOutlet UILabel *scoreLabel;
14 @property NSInteger count;
15 @property NSInteger seconds;
16 @property NSTimer *timer;
17
18 -(IBAction)buttonPressed:(id)sender;
19
20 end
21
22 implementation ViewController
23
24 -(void)viewDidLoad {
25     [super viewDidLoad];
26     // Do any additional setup after loading the view, typically
27     [self setupGame];
28
29
30
31 -(void)didReceiveMemoryWarning {
32     [super didReceiveMemoryWarning];
33     // Dispose of any resources that can be recreated.
34
```

The right pane, titled 'Context View', shows the definition preview for the selected method: `-(void)setupGame`. The code in the preview is:

```
-(void)setupGame {
    self.seconds = 30;
    self.count = 0;

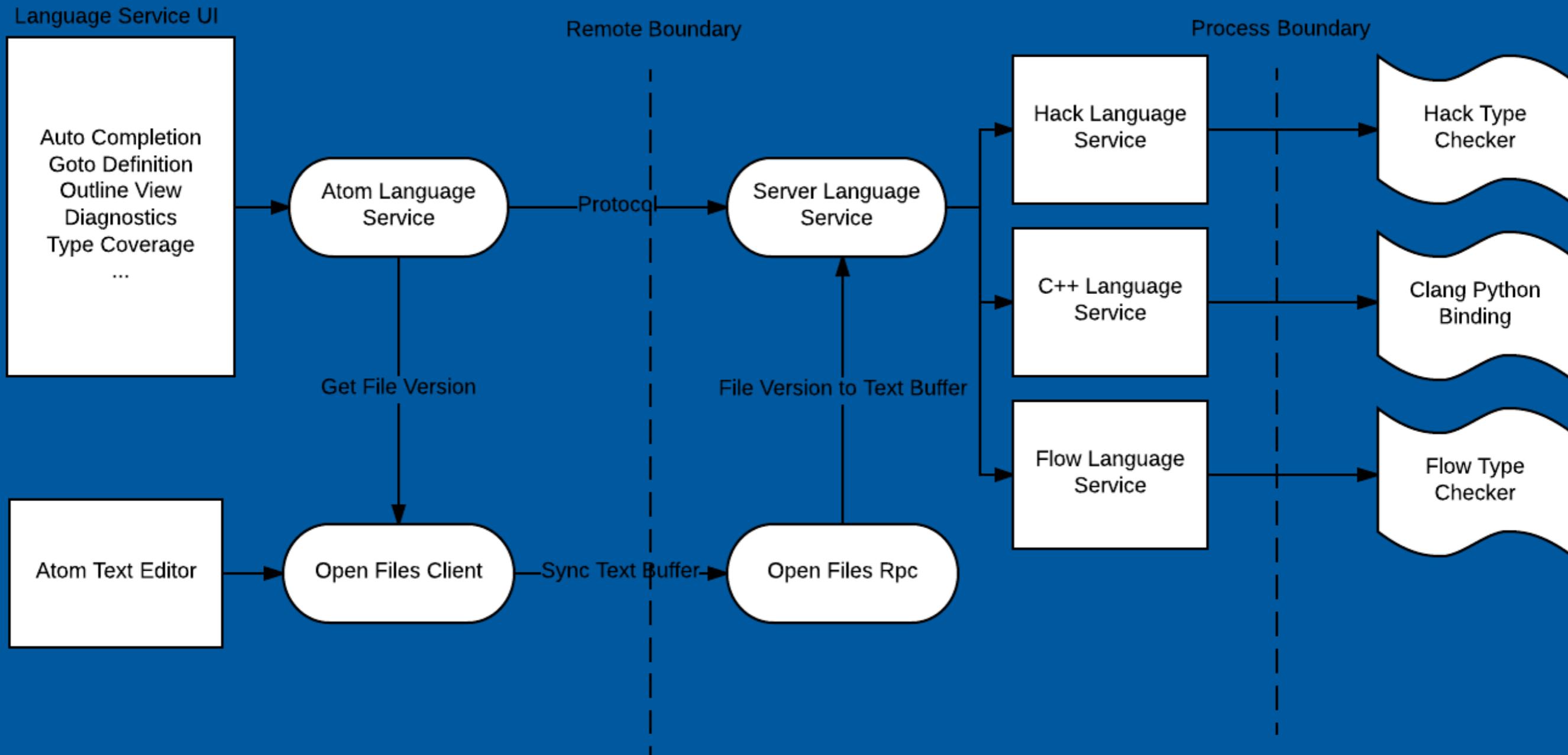
    self.timerLabel.text = [NSString stringWithFormat:@"Time
self.scoreLabel.text = [NSString stringWithFormat:@"%li'

    self.timer = [NSTimer scheduledTimerWithTimeInterval:1.0
        target:self
        selector:@selector
        userInfo:nil
        repeats:YES];
}

-(void)subtractTime {
```

At the bottom of the context view, there are controls for 'Height' (with minus and plus buttons) and a button labeled 'Open in main editor'.

# Language Service Architecture



# Debugger

## Support Languages/Platforms

- Php/Hack
- C++
- Node JS
- React Native

## Features

- General: launch/attach, stepping, callstack, threads, watch/locals/datatip, REPL console, single thread stepping, pause on exception etc...
- HHVM/PHP: function evaluation triggering breakpoint
- C++: LLDB console-based debugger commands

## Extensibility

- First class API for customizing launch/attach UI
- VSCode Debugger Compatible

# C++/Native Debugger

The screenshot displays a C++ debugger interface with the following components:

- Source Code:** A C++ program named `threads.cpp` is shown. The code defines a `PrintHello` function that prints a message with a thread ID and then sleeps for 3 seconds. The `main` function creates one thread. A breakpoint is set at line 12.
- Console:** Shows the debugger's execution log, including messages about thread creation and the active thread switch from 9405516 to 9405640.
- Call Stack:** Shows the current call stack with the following entries:

Index	Address	File Location
0	<code>PrintHello(void*) +22</code>	<code>threads.cpp:12</code>
1	<code>__pthread_body +b4</code>	<code>0x700003778f10:1</code>
2	<code>__pthread_start +11e</code>	<code>0x700003778f50:1</code>
- Threads:** Lists the threads in the process:

ID	Address	Stop Reason
9405516	<code>__semwait_signal +a</code>	
<b>9405640</b>	<code>PrintHello(void*) +22</code>	<b>breakpoint 3.1</b>
- Breakpoints:** Shows two active breakpoints: `threads.cpp:12` and `threads.cpp:22`.
- Scopes:** Shows the local variables in the current scope:

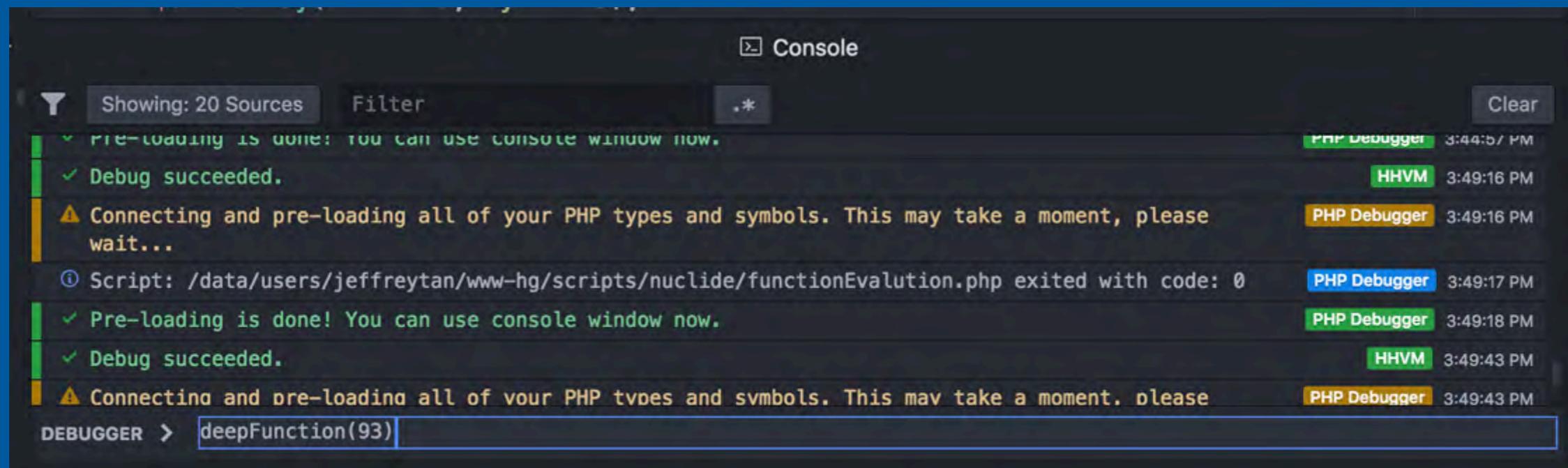
```
> threadid: (void *) 0x0000000000000000
tid: (long) 0
```
- Watch Expressions:** A section for adding watch expressions.

# Function Evaluation Triggering breakpoint(HHVM-only) – Part1

The screenshot displays a PHP debugger interface with the following components:

- Code Editor:** Shows the source code for `functionEvaluation.php`. The code includes a `add_one` function, a `deepFunction` function, and a `$foo` variable. A breakpoint is set at line 18, `$x = $foo(3);`.
- Debugger Panel:** Located on the right, it includes:
  - Call Stack:** Shows the current call stack with `{main}` at `functionEvaluation.php:18`.
  - Threads:** Shows a single thread with ID 14, address `{main}`, and stop reason `breakpoint`.
  - Breakpoints:** Lists active breakpoints at `functionEvaluation.php:9`, `functionEvaluation.php:18`, and `threads.cpp:22`.
  - Scopes:** Shows local variables like `$HTTP_RAW_POST_DATA` (undefined) and `$argc` (1).
  - Watch Expressions:** Includes an input field for adding new watch expressions.
- Console:** Shows the execution log, including messages like "Debug succeeded" and "Script: /data/users/jeffreytan/www-hg/scripts/nuclide/functionEvaluation.php exited with code: 0".

# Function Evaluation Triggering breakpoint(HHVM-only) – Part2



The screenshot shows a debugger console window titled "Console". At the top, it says "Showing: 20 Sources" and "Filter \*.\*". The console contains several log entries:

- ✓ Pre-loading is done! You can use console window now. (PHP Debugger 3:44:57 PM)
- ✓ Debug succeeded. (HHVM 3:49:16 PM)
- ⚠ Connecting and pre-loading all of your PHP types and symbols. This may take a moment, please wait... (PHP Debugger 3:49:16 PM)
- ① Script: /data/users/jeffreytan/www-hg/scripts/nuclide/functionEvaluation.php exited with code: 0 (PHP Debugger 3:49:17 PM)
- ✓ Pre-loading is done! You can use console window now. (PHP Debugger 3:49:18 PM)
- ✓ Debug succeeded. (HHVM 3:49:43 PM)
- ⚠ Connecting and pre-loading all of your PHP types and symbols. This may take a moment, please wait... (PHP Debugger 3:49:43 PM)

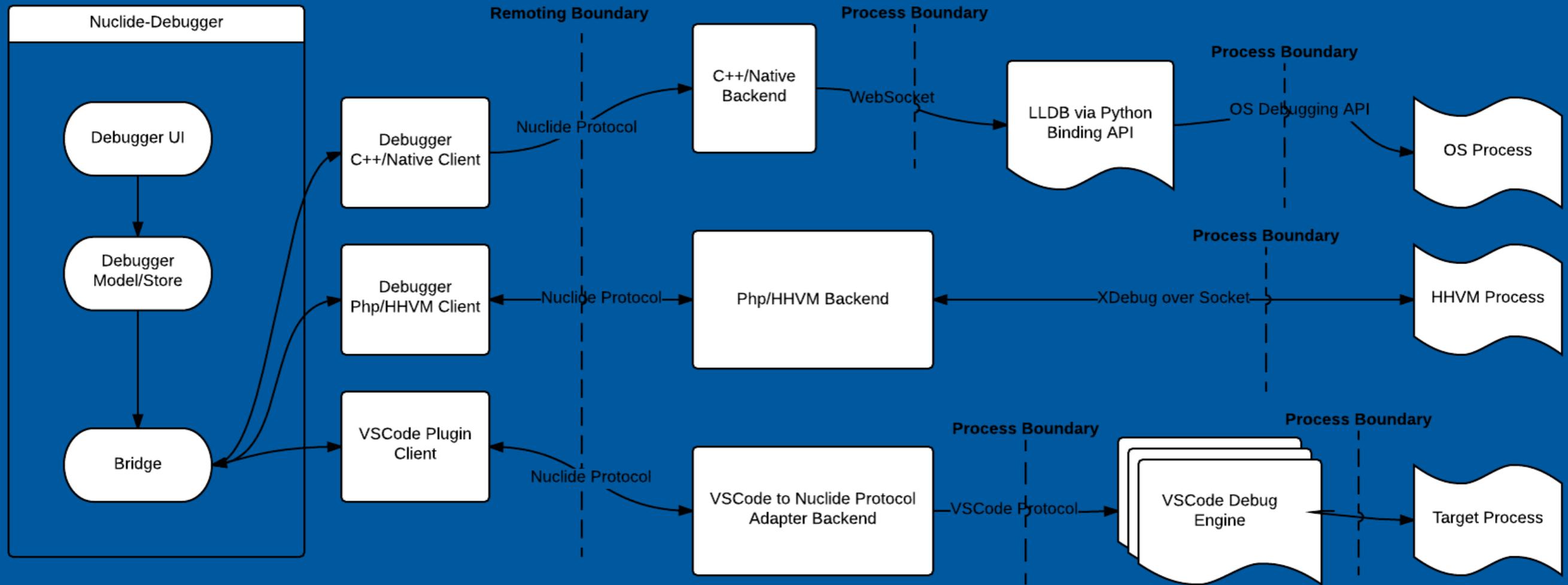
At the bottom, the debugger prompt "DEBUGGER >" is followed by the command "deepFunction(93)".

# Function Evaluation Triggering breakpoint(HHVM-only) – Part3

The screenshot displays a PHP debugger interface with the following components:

- Code Editor:** Shows the source code for `functionEvaluation.php`. The code includes functions `add_one`, `deepFunction`, and `foo`. A breakpoint is set at line 9, which is highlighted in blue. The current execution point is at line 18, where `$x = $foo(3);` is being evaluated.
- Debugger Panel:** Located on the right, it contains several sub-panels:
  - Call Stack:** Shows the current call stack with three frames: `deepFunction` at `functionEvaluation.php:9`, `include` at `Unknown:1`, and `{main}` at `functionEvaluation.php:18`.
  - Threads:** Shows a single thread with ID 17, name `deepFunction`, and stop reason `breakpoint`.
  - Breakpoints:** Lists three breakpoints: `functionEvaluation.php:9` (checked), `functionEvaluation.php:18` (checked), and `threads.cpp:22` (unchecked).
  - Scopes:** Shows the local scope with `$param: 93`.
  - Watch Expressions:** A section for adding watch expressions, currently empty.
- Console:** Located at the bottom, it shows a log of messages from the PHP Debugger and HHVM. The most recent message is "Hit breakpoint in evaluated code." from the PHP Debugger at 3:54:07 PM.

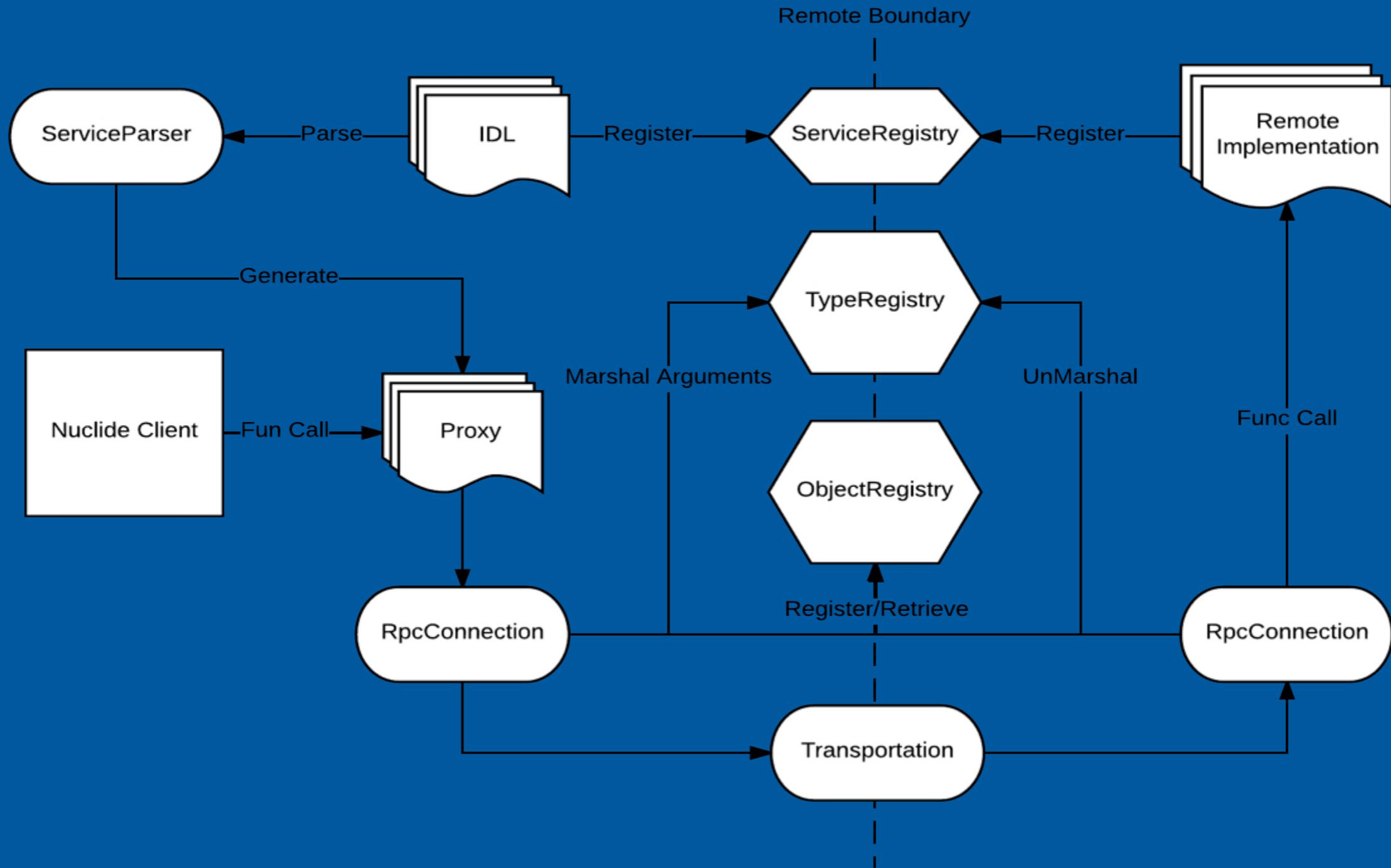
# Runtime Architecture



# Nuclide Remoting Framework

- RPC system enables transparently call a function/method either locally or remotely on another machine.
- Enable code reuse
  - One package implementation can be used/called in both local and remote scenarios without written twice.
- Interface definition language(IDL)
  - Written in JS language
  - Combine of ES6 module exports and Flow type definitions
  - Uses Babylon parser to parse it
- Features/Components
  - TypeRegistry: marshal/unmarshal runtime objects/data into transportable JSON format data.
  - ObjectRegistry: call by reference vs call by value.
  - Transportation neutral: customizable transportation layer(e.g. websocket, stdin/stdout, socket, shared memory etc...)

# RPC Architecture



# Technologies Stack

**Node.js**

**ES6/ES7**

**Flow**

**Reactive Programming**

**React JS + Flux**

# JavaScript ES6/ES7

Babel transpiler

Scoping

- let and const
- block scope functions

Template string

```
const customer = { name: "Foo" };
```

```
const message = `Hello ${customer.name}`;
```

Export and Import

Destruction using pattern matching

Class definition and inheritance

Async programming

- await and promise

# Flow

A JavaScript type checker designed by Facebook.

- Flow checks your code for errors through static type annotations
- Type Inference using data flow analysis
- Gradual adoption for legacy codebase
- First class support in Nuclide
  - Dogfooding everyday by Nuclide team
- Realtime feedback

```
1 // @flow
2 function square(n: number): number {
3     return n * n;
4 }
5
6 square("2"); // Error!
```

# Reactive Programming

RxJS is a library for reactive programming using Observables, to make it easier to compose asynchronous or callback-based code.

## Benefits

- Functional — less mutation, avoid stateful program
- Less code
- Async error handling.

## RxJs

```
Rx.Observable.from(["Reactive", "Extensions",  
"Java"])  
  .take(2)  
  .map(function(s) { s + " : on " + new  
Date()})  
  .subscribe(function(s) {console.log(s)});
```

### Result:

```
Reactive : on Wed Jun 17 21:54:02  
GMT+02:00 2015  
Extensions : on Wed Jun 17 21:54:02  
GMT+02:00 2015
```

# React JS + Flux

## React JS

- A JavaScript library for building user interface
- Declarative
- Component-Based

## Flux

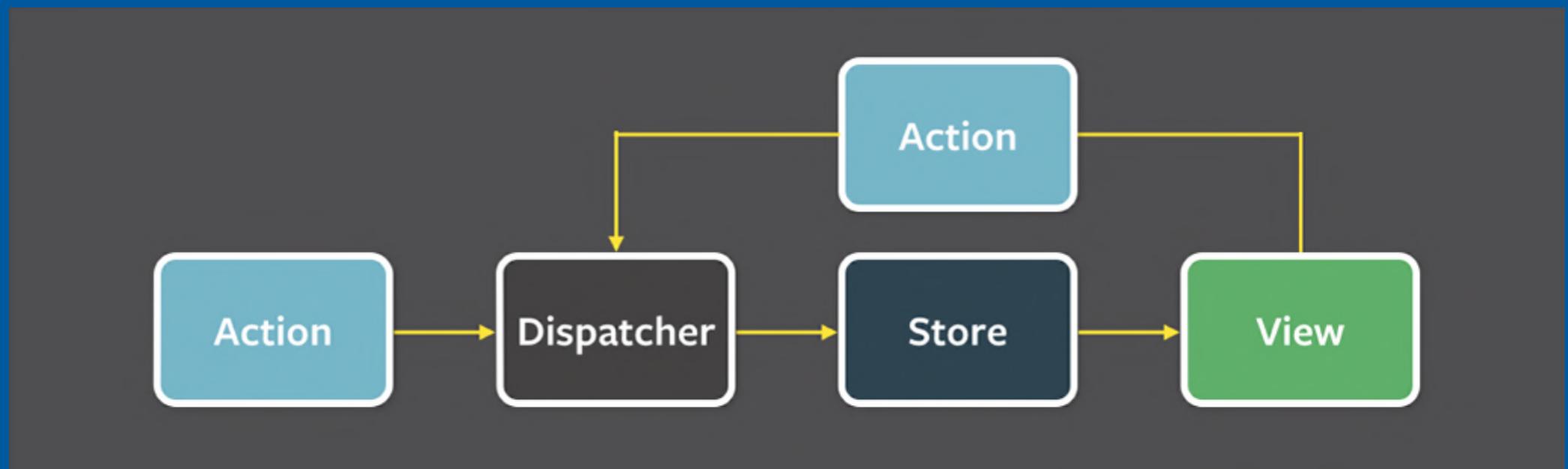


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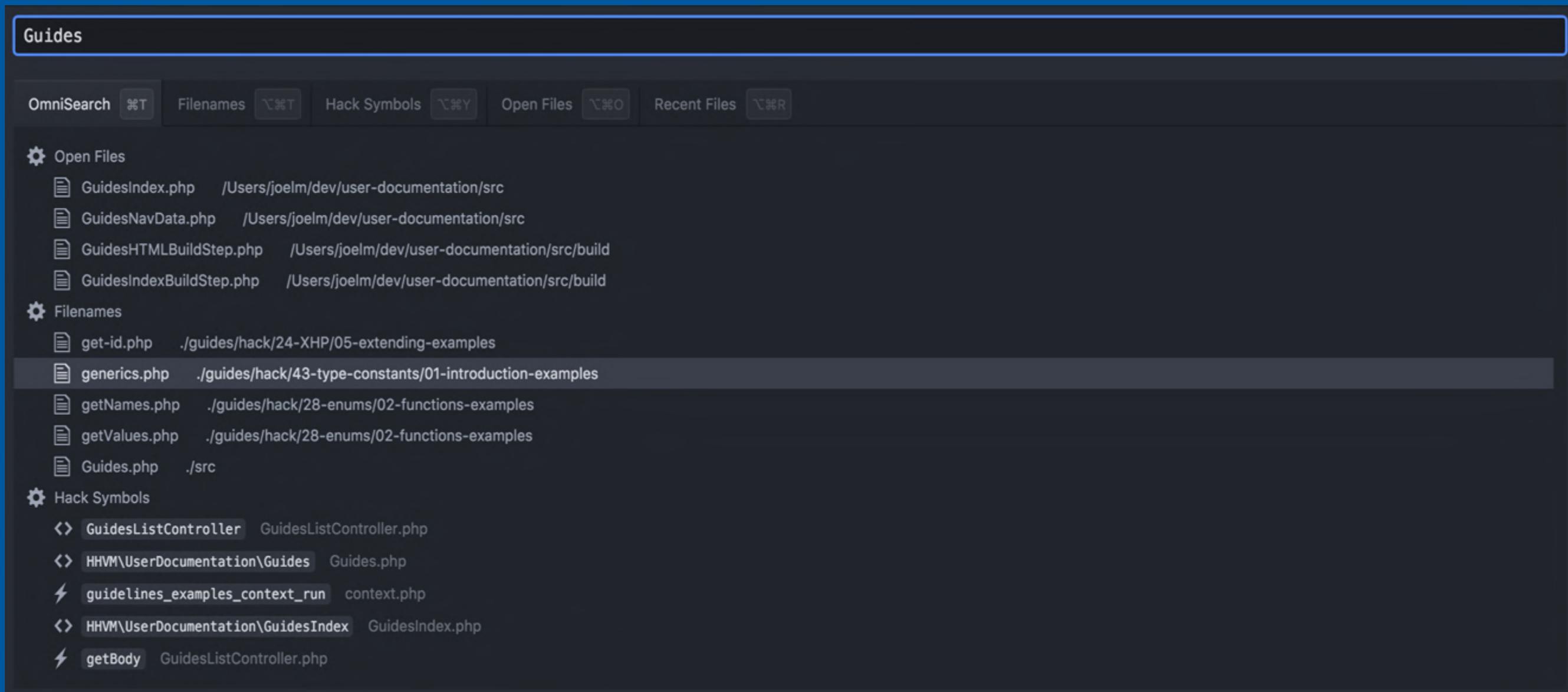
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- Introduction and History
- Architecture
- **Innovations**
- Remote Development

# Innovations in Nuclide

- Remote development
- Quick Open
- Diff View
- Phabricator Integration
- Working Sets
- Etc.

# Quick Open



# Diff View

- Diff View
  - Editable, not read only
  - Easy to locate changes
  - Old code to provide context
  - Only available on Mercurial

# Without Diff View

```
Breakpoi × | protocol.j... | Breakpoin... | Breakpoin... | Breakpoin... | Bridge.js | Callstack... | Callstack... | ChromeA... | Comman... | constants... | Debugger... | Debugger...
1 {
2   "version": { "major": "1", "minor": "1" },
3   "domains": [{
4     "domain": "Inspector",
5     "hidden": true,
6     "types": [],
7     "commands": [
8       {
9         "name": "enable",
10        "description": "Enables inspector domain notifications."
11      },
12      {
13        "name": "disable",
14        "description": "Disables inspector domain notifications."
15      }
16    ],
```

# Diff View

The screenshot displays a diff view in a code editor. The left pane, labeled 'Original (Read Only)', shows the original code. The right pane, labeled 'Breakpoint', shows the modified code. The changes are highlighted in green and red. The diff shows a change in the event name from 'BreakpointAdded' to 'This is an editor' in the `next()` call. Below the code, there is a 'Source Control Navigator' showing a list of revisions. The top revision is '1 Uncommitted Change' with a 'Commit' button. Below it are three closed revisions: 'e454ecd jeffreytan D5296918 Accepted arcpatch-D5296918 Make BreakpointManager to use single method for raising event', 'a229658 jeffreytan D5258033 Closed Handle php debugger evaluation failure error dialog', and '26d7be0 jeffreytan D5257218 Closed Fix remove breakpoint warning because of binding to new location'. On the right side, there is a 'Diagnostics' panel with 'Changed Sections' and 'File Changes' sections. The 'File Changes' section shows 'BreakpointManager.js' and 'constants.js' with change indicators.

```
Original (Read Only) | Breakpoint | BridgeAd... | Debugger... | Debugger... | EventRep... | Execution... | NuclidePr... | Obj...
```

```
244     location,
245     breakpoint.request.condition,
246   ),
247   });
248   // Update original request's location to the new bound one.
249   breakpoint.request.lineNumber = location.lineNumber;
250   } else {
251     // Some engine(C++) may fire breakpointResolved before setBre
252     // is resolved.
253     this._breakpointEvent$.next([
254       'BreakpointAdded',
255     ],
256     this._createResolvedBreakpointFromLocation(location, ''),
257     );
258   }
259 }
260 _getBreakpointFromId(breakpointId: BreakpointId): ?UserBreakpoint
261 return this._breakpointList.find(bp => bp.id === breakpointId);
262 }
263
```

```
244     location,
245     breakpoint.request.condition,
246   ),
247   });
248   // Update original request's location to the new bound one
249   breakpoint.request.lineNumber = location.lineNumber;
250   } else {
251     // Some engine(C++) may fire breakpointResolved before set
252     // is resolved.
253     this._raiseIPCEvent([
254       'BreakpointAdded',
255       'This is an editor',
256     ],
257     this._createResolvedBreakpointFromLocation(location, '')
258     );
259   }
260 }
261 _getBreakpointFromId(breakpointId: BreakpointId): ?UserBreakpo
262 return this._breakpointList.find(bp => bp.id === breakpointI
263 }
264
```

Source Control Navigator | Phabricator Review | Diagnostics

Compare Revisions

1 Uncommitted Change

- e454ecd jeffreytan D5296918 Accepted arcpatch-D5296918 Make BreakpointManager to use single method for raising event
- a229658 jeffreytan D5258033 Closed Handle php debugger evaluation failure error dialog
- 26d7be0 jeffreytan D5257218 Closed Fix remove breakpoint warning because of binding to new location

Submit for review

Changed Sections: [down] [up]

File Changes

- BreakpointManager.js
- constants.js

# Phabricator

- A code collaboration tool that was initially built in Facebook.
- It includes features such as code review and repository browsing
- Open sourced in 2010.

# Phabricator

Diff 27346534 Disable Sticky Header

**Tools/Nuclide/pkg/nuclide-debugger/lib/Protocol/BreakpointManager.js** View Options ▾

Show First 20 Lines · Show All 231 Lines · ▼ Show 20 Lines

<pre>232 } 233 234 _sendBreakpointResolved( 235   breakpointId: BreakpointId, 236   location: Location, 237 ): void { 238   const breakpoint = this._getBreakpointFromId(breakpointId); 239   if (breakpoint != null) { 240     this._breakpointEvent\$.next(['BreakpointRemoved', breakpoint.request]); 241     this._breakpointEvent\$.next([</pre>	<pre>232 } 233 234 _sendBreakpointResolved( 235   breakpointId: BreakpointId, 236   location: Location, 237 ): void { 238   const breakpoint = this._getBreakpointFromId(breakpointId); 239   if (breakpoint != null) { 240     this._raiseIPCEvent(['BreakpointRemoved', breakpoint.request]); 241     this._raiseIPCEvent([</pre>
---	---

**lifeihuang commented** Line 241 Previous · Next · Like · Reply

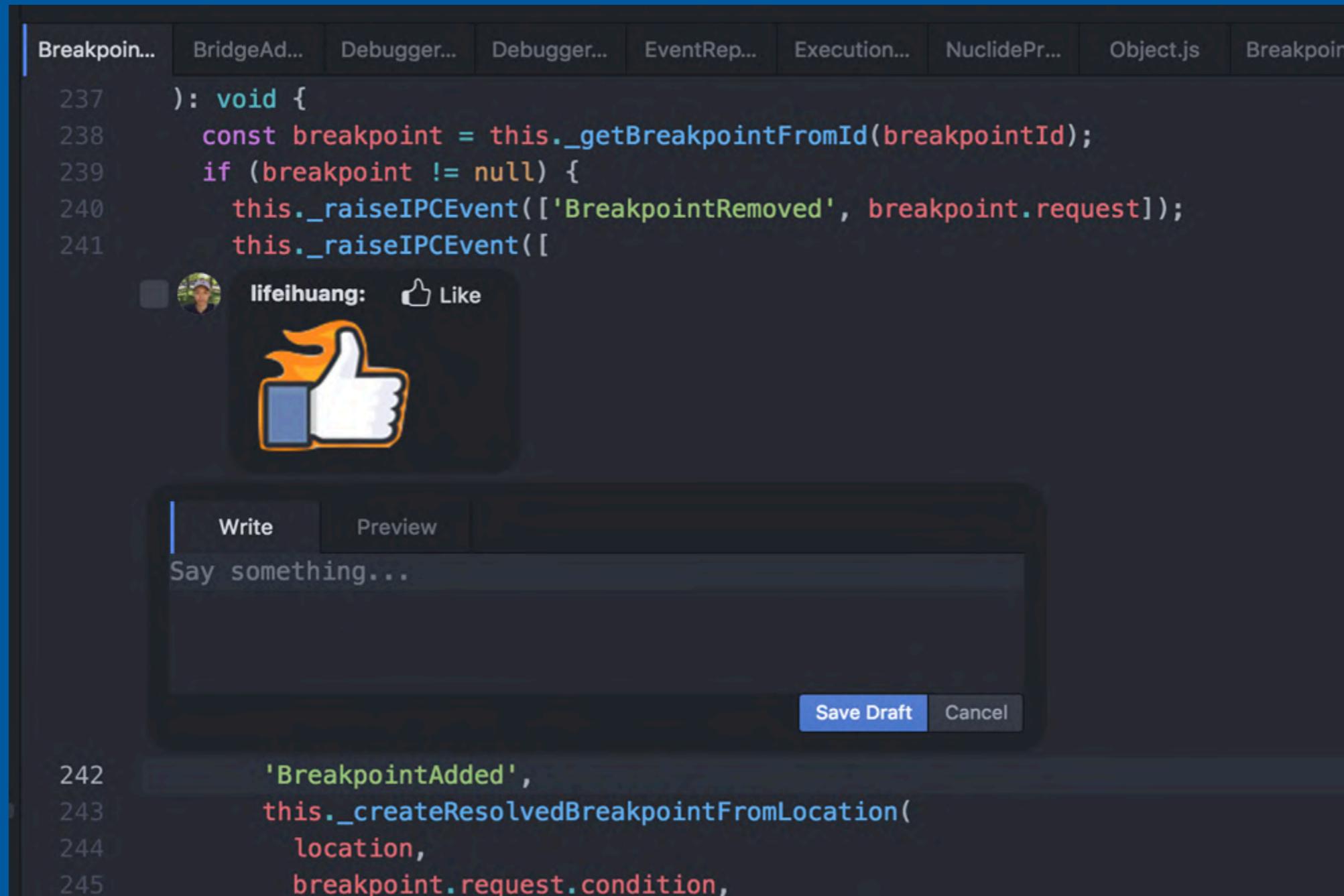


<pre>242   'BreakpointAdded', 243   this._createResolvedBreakpointFromLocation( 244     location, 245     breakpoint.request.condition, 246   ), 247 ]);</pre>	<pre>242   'BreakpointAdded', 243   this._createResolvedBreakpointFromLocation( 244     location, 245     breakpoint.request.condition, 246   ), 247 ]);</pre>
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# Phabricator Integration

- Phabricator Integration
  - Review comments inline where the code is
  - Navigation and check progress
  - Reply to comments
  - Today only available internally

# Phabricator Integration



The screenshot displays a Phabricator code review interface. At the top, there are several tabs for different files: Breakpoin..., BridgeAd..., Debugger..., Debugger..., EventRep..., Execution..., NuclidePr..., Object.js, and Breakpoin... The main area shows a code diff for a JavaScript file. The code is as follows:

```
237 ): void {
238   const breakpoint = this._getBreakpointFromId(breakpointId);
239   if (breakpoint !== null) {
240     this._raiseIPCEvent(['BreakpointRemoved', breakpoint.request]);
241     this._raiseIPCEvent([
```

Below the code, there is a comment from user 'lifeihuang'. The comment includes a thumbs-up icon with a flame effect and the text 'Like'. Below the comment is a text input field with the placeholder text 'Say something...'. At the bottom right of the input field, there are two buttons: 'Save Draft' and 'Cancel'.

```
242     'BreakpointAdded',
243     this._createResolvedBreakpointFromLocation(
244       location,
245       breakpoint.request.condition,
```

# Phabricator Integration

```
Original (Read Only)
235     breakpointId: BreakpointId,
236     location: Location,
237 ): void {
238     const breakpoint = this._getBreakpointFromId(breakpointId);
239     if (breakpoint !== null) {
240         this._breakpointEvent$.next(['BreakpointRemoved', breakpoint]);
241         this._breakpointEvent$.next([
242             'BreakpointAdded',
243             this._createResolvedBreakpointFromLocation(
244                 location,
245                 breakpoint.request.condition,
246             ),
247         ]);
248         // Update original request's location to the new bound one
249         breakpoint.request.lineNumber = location.lineNumber;
250     } else {
251         // Some engine(C++) may fire breakpointResolved before set
252         // is resolved.
253         this._breakpointEvent$.next([
254             'BreakpointAdded',
255             this._createResolvedBreakpointFromLocation(location, ''
256         ]);
257     }
258 }
259 }
```

```
BreakpointManager.js
235     breakpointId: BreakpointId,
236     location: Location,
237 ): void {
238     const breakpoint = this._getBreakpointFromId(breakpointI
239     if (breakpoint !== null) {
240         this._raiseIPCEvent(['BreakpointRemoved', breakpoint.r
241         this._raiseIPCEvent([
242             'BreakpointAdded',
243             this._createResolvedBreakpointFromLocation(
244                 location,
245                 breakpoint.request.condition.
```

lifeihuang: Like



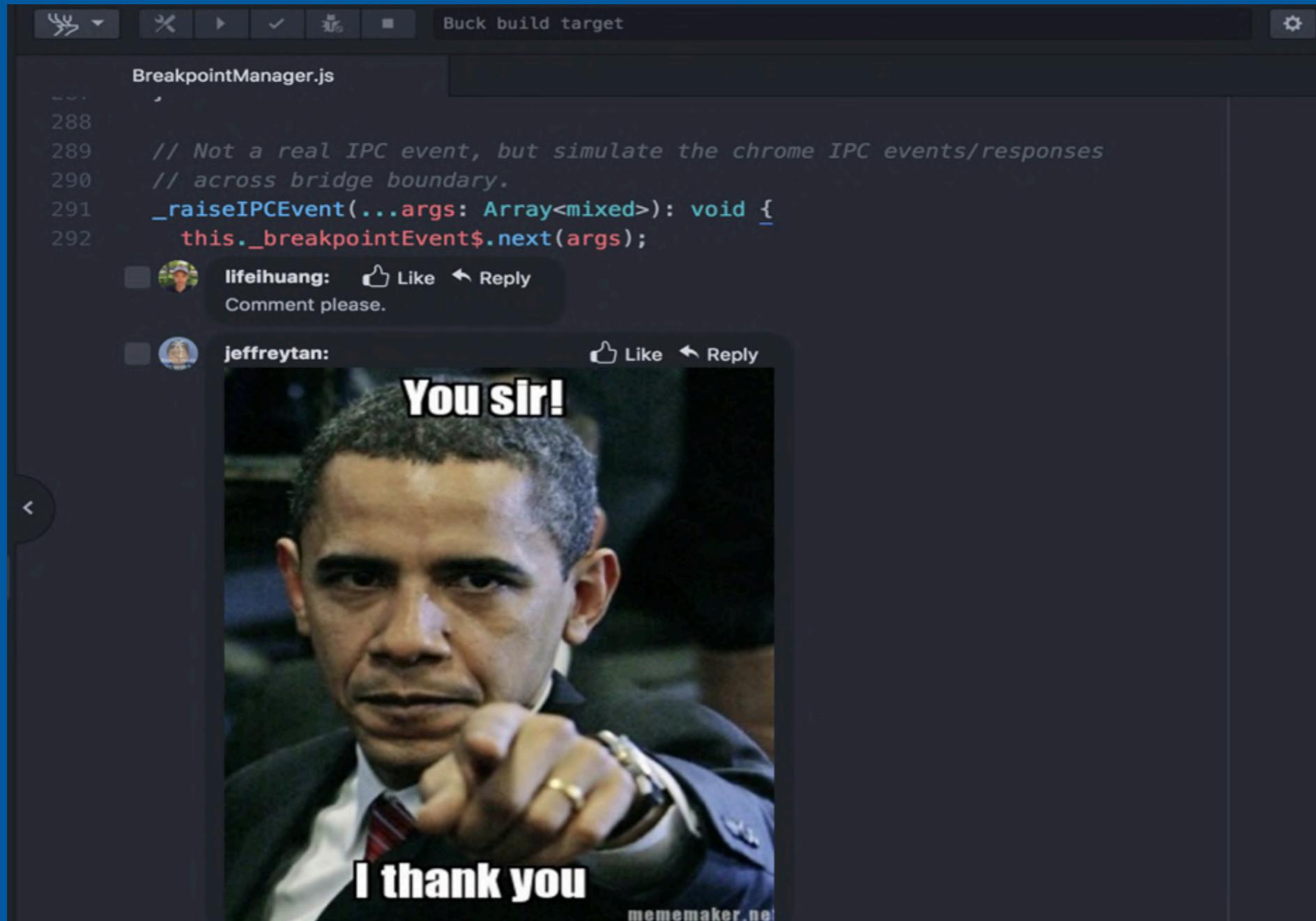
Write Preview

Say something...

Save Draft Cancel

```
242     'BreakpointAdded',
243     this._createResolvedBreakpointFromLocation(
244         location,
245         breakpoint.request.condition.
```

# Phabricator Integration



The screenshot shows a Phabricator code review interface. At the top, there's a toolbar with icons for navigation and actions, and a title bar that says "Buck build target". Below that, the code editor shows a file named "BreakpointManager.js" with the following code:

```
288  
289 // Not a real IPC event, but simulate the chrome IPC events/responses  
290 // across bridge boundary.  
291 _raiseIPCEvent(...args: Array<mixed>): void {  
292   this._breakpointEvent$.next(args);  
}
```

Below the code, there are two comments. The first comment is from "lfeihuang" and says "Comment please.". The second comment is from "jeffreytan" and includes a meme image of Barack Obama pointing, with the text "You sir!" at the top and "I thank you" at the bottom. The meme also has a "mememaker.net" watermark at the bottom right.

TABLE OF  
**CONTENTS 大纲**

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- Introduction and History
- Architecture
- Innovations
- **Remote Development**

# Advantages of Remote Development

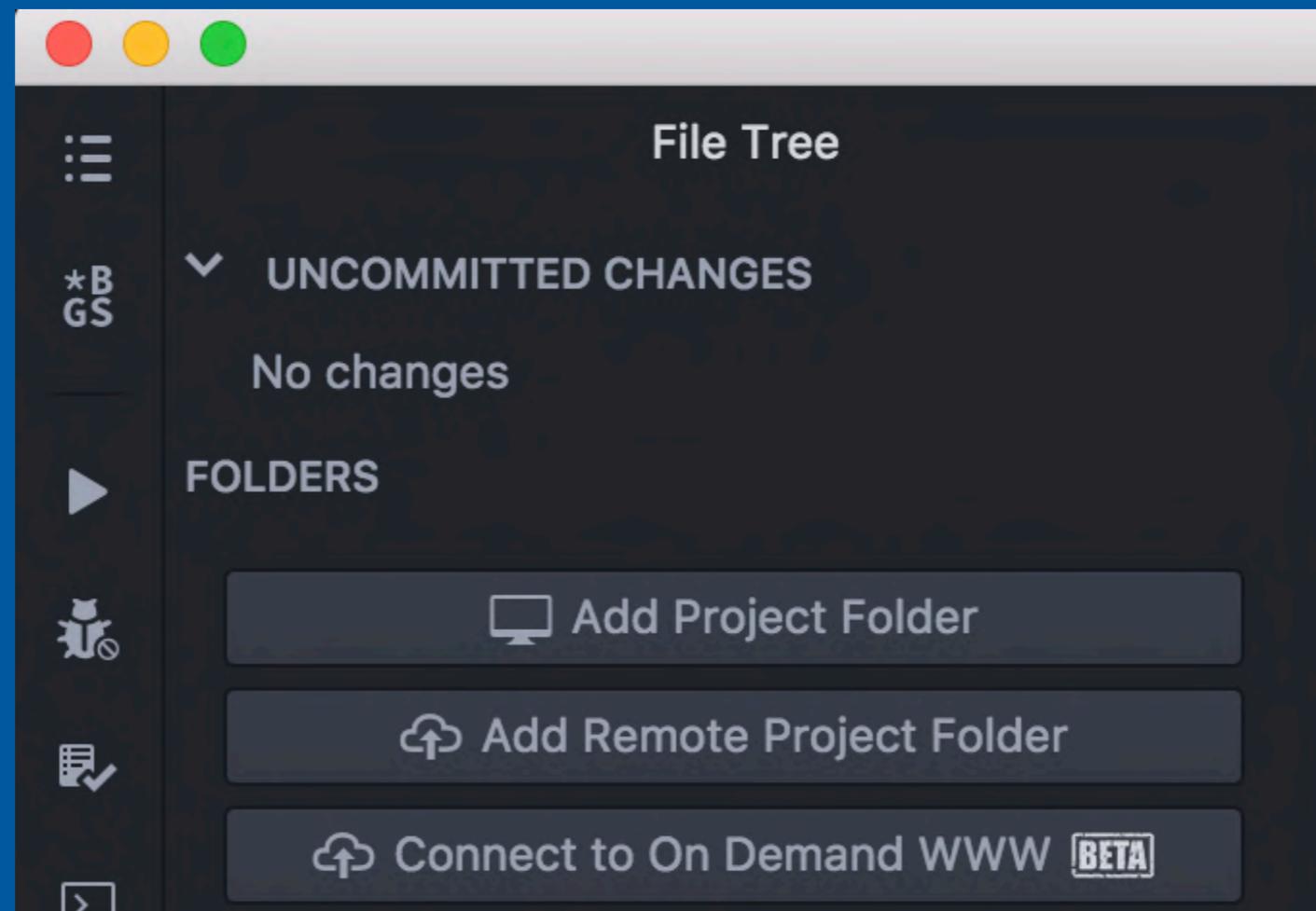
- Thin client
- Heavy computation power
- No deployment
- Resource sharing
- Mobility
- Secure

# Challenges in Remote Development

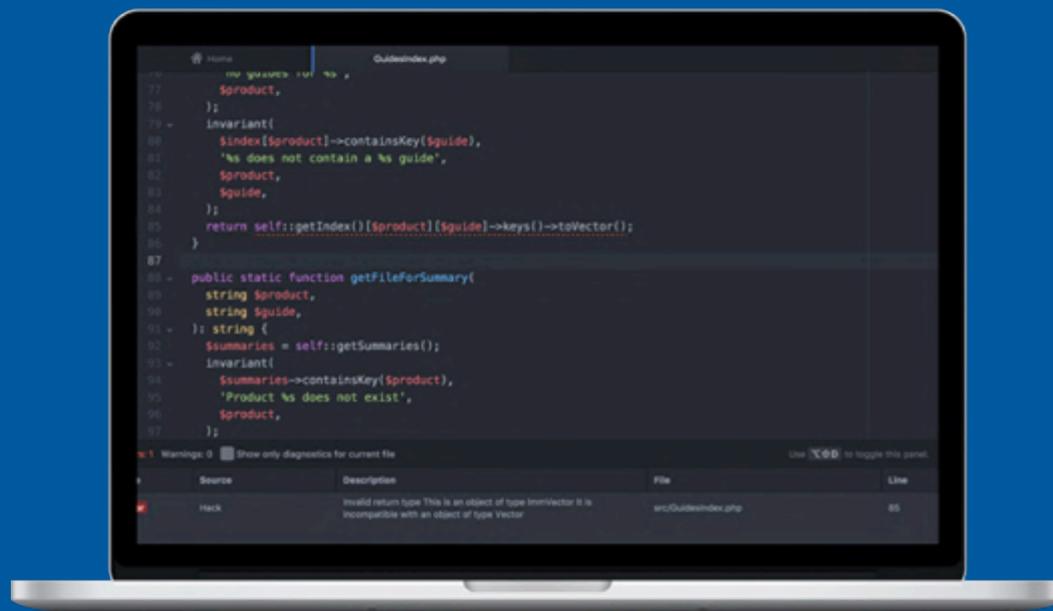
- Disconnection
- Latency, latency, latency
- Security vs user experience.
- Offline mode

# The Next Step of Remote Development

# On Demand Nuclide



# On Demand Nuclide



CODE GEN  
SERVICES



# Why On Demand Nuclide

- Perfect for small code changes, big repo
- Multi-tasking
- No server and repo management
- Share diffs easily

# On Demand Nuclide



## Example diff

11 mins ago • Author: kcoons • 2 lines •  
Reviewers: trunkagent • facebook-www



# How Do I Get Started

- <https://nuclide.io/>

# THANKS!

让创新技术推动社会进步

HELP TO BUILD A BETTER SOCIETY WITH  
INNOVATIVE TECHNOLOGIES

# Geekbang >

极客邦科技

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