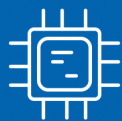


JMP Discovery Europe 2021

Extending Hamcrest automated testing of JSL applications for continuous improvement.



1



How you too can build a productive, cost effective, high QA, highly reliable and supportable, JMP-based, mission-critical integrated analytical systems.

2

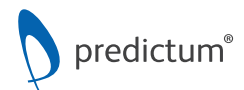
Agenda



- Introduction
- About Predictum
- Background of our JSL Development infrastructure
- Results
- Demonstration
- What's next
- Q&A

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Speakers



Vince Faller
Chief Software Engineer
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Wayne Levin
President
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About Predictum Inc.

- Launched in March 1992
- JMP Partner
- Offerings
 - Training
 - Consulting
 - Integrated Analytical Applications Development
- First JMP-based application delivered in 2000 with JMP 4.0
- Have been building large, integrated applications since JMP 8 or 9



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Background

- Until 2nd ½ of 2019, we had a disparate, piecemeal, project management
 - Separate apps for version control, time management, project management
- Developers were spending easily 50% of their time doing routine, mechanical tasks
 - Encrypting and packaging JMP add-ins, maintaining configuration packages, maintaining separate repos for encrypted and unencrypted code
- 10+ years of legacy framework built on JMP 5 was getting bloated and slow
 - JMP software has come a long way in that time
 - JMP9 introduced namespaces
 - JMP14 introduces classes and from that comes the Hamcrest JSL add-in

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The Transformation Begins

- Acquired Gitlab licenses and began implementation
- New development architecture begins to take shape
- Architecture has been expanding and improving with new capabilities delivered monthly through 2020, continuing today and the foreseeable future

AUGUST 2019						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Printable Calendars From 123Calendars.com

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Predictum DevOPS / Lean Code Development Results

- Accelerate development
 - Automation to support frequent tests [Test Early, Test Often!]
 - Supports re-using code [Predictum System Framework 2.0]
 - 50+% increase in productivity
 - Developers much happier, less frustrated, more focussed on their work
- Development Standards
 - Style Guide for Functions
 - Each Function requires at least 1 Hamcrest test.
 - Code Reviews
 - Break Code Challenges

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Predictum DevOPS / Lean Code Development

- Development Management
 - Assign & track resource allocation
 - Everyone knows what everyone else is doing
 - More easily divide and distribute work among our development team
 - Due to the CI/CD Pipeline, code collisions are detected early
- Improve supportability across multiple staff
 - Those not part of active development are effectively supporting as well
- Advance Quality Assurance
 - Supports FDA requirement for QA, verification
 - Validation, IQ,OQ,PQ

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Used Internally & Externally

CoBaseTM

Knowledge repository
Easily save & index JMP and other files
Tag, Search, Retrieve, Re-Use

SashLABTM

Virtual Lab, Digital Twin
Compounding, formulations,
manufacturing & other applications

S-VEM

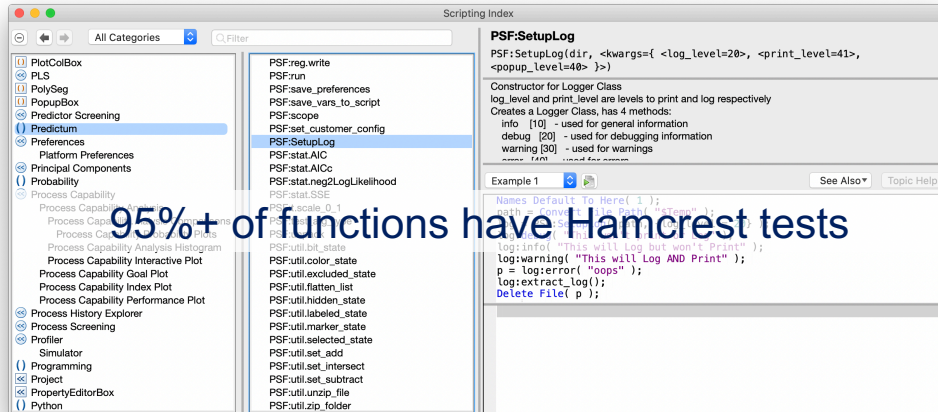
Self-Validated Ensemble Modeling:
Apply machine learning methods to
small sets of data, including DOEs

All client projects are developed with this new DevOps architecture and software version management

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Predictum System Framework (PSF) 2.0



95%+ of functions have Hamcrest tests

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Components



Hamcrest, Unit Test



Gitlab, Project Management & CI/CD Pipeline



Predictum System Framework 2.0



Visual Studio Code, Extension for JSL



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PREDICTUM DEVOPS DEMONSTRATION

VINCE FALLER

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Hamcrest

- Hamcrest is a unit testing library built by Justin Chilton and Evan McCorkle from JMP
- Allows developers to write tests for code to check expected outputs
- For more info, see their [Discovery 2019 Presentation](#)

```
PSFFWB_Test - JAMP Pro
File Edit Tables DDE Analyze Graph Tools Predictum Add-Ins View Window Help
4 // cases should be test cases so you can for through them and do the same thing to each one with different parameters
5 if(% Items(Include File List()) == 1,
6   Include("common.jsl");
7   cl_startup();
8 );
9
10 fwb_case = uttestcase("PSFFWB")
11 << Setup( Expr(
12   dt = open("$SAMPLE_DATA$Big (Class.jmp)", private);
13   random reset(537824);
14   round_match = 10;
15   ut_case_name = "PSJ";
16 ));
17
18 // FwB when all kwards are given
19 num_fwb_case = uttestcase("PSFFWB_run")
20 << Setup( Expr(
21   Eval(Name Expr(fwb_case:setupexpr));
22   ut_fwb = PSJ.fwb.fwbidx;
23   y = "Height";
24   effects = {weight: isex, :weight * sex,
25             EstMeth = Expr(Estimation Method: Forward Selection)},
26   n_simulations = 28
27 );
28 );
29 next(0);
30 rpt = currentReport();
```

Test Runner X Log

```
58 x 1
PSJStartup
PSFFWB
PSFFWB_run
  fwb.fwb
  fwb.get_log_odds
  fwb.get_log_odds.kwarg
  fwb.plot_log_odds
PSFFWB_continuous_cols

FAILURE Get Window("Log Odds 2 - Graph Builder") not empty() (PSFFWB_run >
  fwb.get_log_odds.kwarg > 1)
  Actual: was empty()
  Expected: not empty()

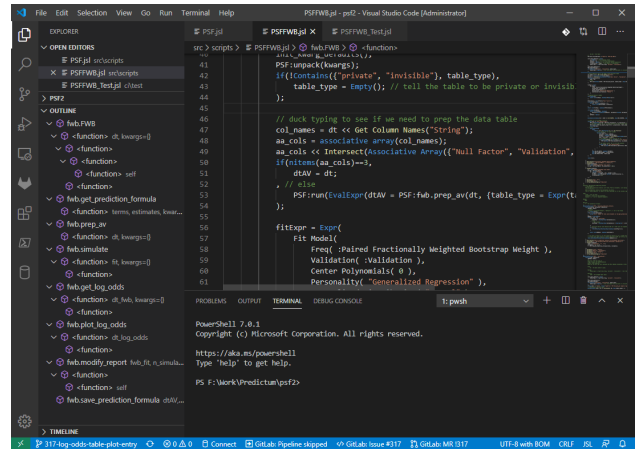
17983771 us (0:00:18)
```

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VS Code

- VSCode is a lightweight text editor that is highly extensible
- Predictum created a free, open source [extension for VS Code](#) to run and edit JSL outside its native editor
 - Syntax highlighting
 - Code Outline
 - Snippets
 - Hover help
 - Ability to run JMP commands (with help from a JMP add-in)
- Can be found in the Directly from VS Code by just searching for “JMP”
 - At time of writing, it’s the only extension returned

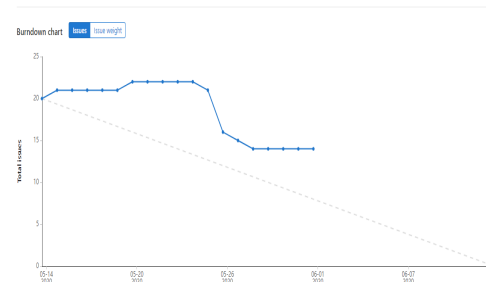


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GitLab

- Started in 2012 with a focus on collaboration, and Continuous Integration/Continuous Deployment (CI/CD)
- We chose GitLab because it seemed like an integrated solution for:
 - Version control (powered by Git)
 - Time tracking
 - Issue/ticket management
 - Project management
 - Project testing and maintenance
- Also, it has [extensive documentation](#)



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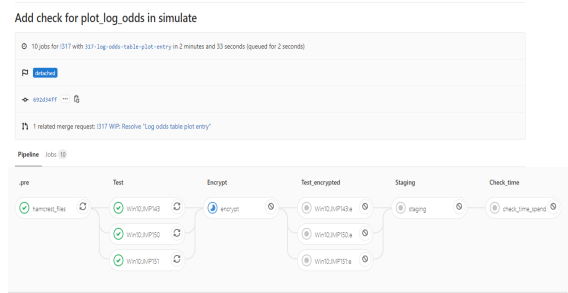
GitLab Repo

- Every JSL project that we create is forked from the same template
 - GitLab makes this very easy with [custom templates](#)
- Every code change is required to have a merge request, usually tied to the initial issue by the customer
 - Makes it very easy to trace why a code change was made and what it does without having to actually run different versions of the app
- Each merge request has a set number of configurable jobs that must pass before that merge request can be approved.
 - This is known as the CI/CD Pipeline

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Predictum's JSL CI/CD Pipeline

- Runs for every change we make, required to pass before we can merge our changes
- Checks that every new or changed function has required Hamcrest tests
- Runs all Hamcrest tests on windows for multiple JMP versions
 - Actively working on getting the runners to support macOS, not quite ready yet
- Encrypts all "protected" scripts in the repo
- Runs all the Hamcrest testing again on the encrypted scripts to test for problems with encryption
- Does a few things to stage the app to create the .jmpaddin file
- Checks that the developer put in their time for billing

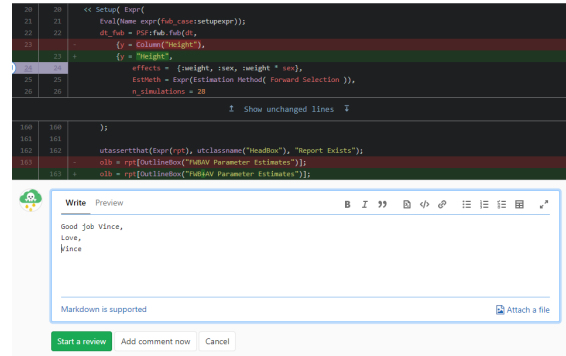


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Code Review/Approval

- Once the developer has said that they're "done" with the work and the pipeline is approved, it gets assigned to an approver.
- They review the code changes right from within GitLab, suggest changes and send it back to the developer
 - This usually happens a few times until all parties are happy
- Once mutual agreement on approval of the new feature is reached, the approver approves it and it becomes part of the real code



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Resources

- Predictum.com
- GitLab website
 - <https://gitlab.com>
 - <https://gitlab.com/predictum/>
- Hamcrest on JMP Community website
 - <https://community.jmp.com/t5/Discovery-Summit-Tucson-2019/Automate-the-Testing-of-JSL-Using-Hamcrest-2019-US-30MP-239/ta-p/223345>
 - <http://hamcrest.org>
- VS Code Extension – go to the VS Code marketplace
 - <https://marketplace.visualstudio.com/items?itemName=VinceFaller.jmp-scripting>

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 predictum®

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Q&A

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