RANGLE.IO

Build Measure Machine Learn with Angular

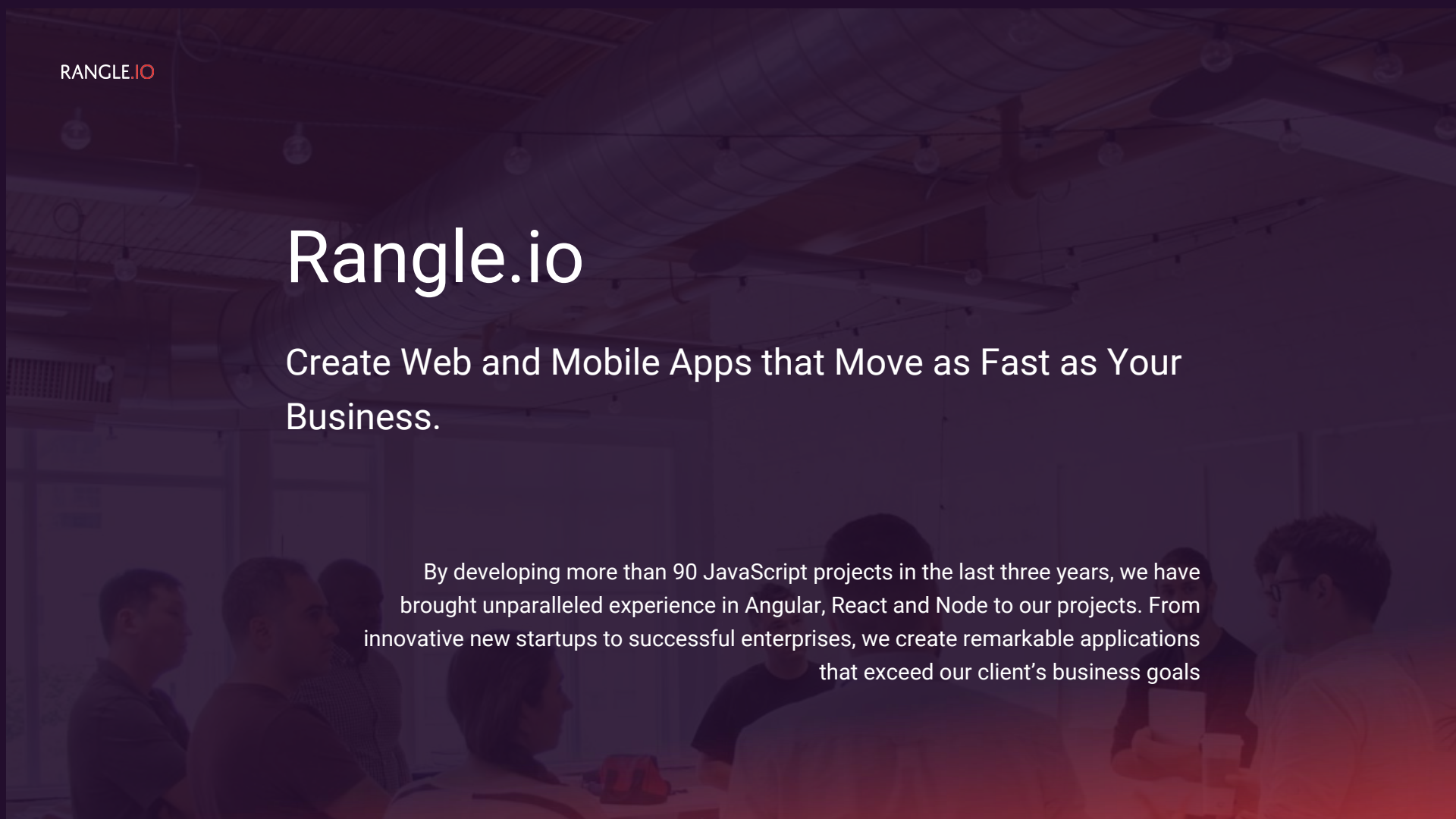
Anna Karpacheva | Sumit Arora

April 2017

Rangle.io

129 Spadina Ave,
Suite 500,
Toronto, ON
M5V 2L3, Canada

(416) 737-1555
info@rangle.io



RANGLE.IO

Rangle.io

Create Web and Mobile Apps that Move as Fast as Your Business.

By developing more than 90 JavaScript projects in the last three years, we have brought unparalleled experience in Angular, React and Node to our projects. From innovative new startups to successful enterprises, we create remarkable applications that exceed our client's business goals

Rangle Presents

@arorasumit

Sumit Arora

Developer

Sumit is a full-stack developer at Rangle. Worked on Augury developing new features and components extensively. Currently working on Angular CLI.

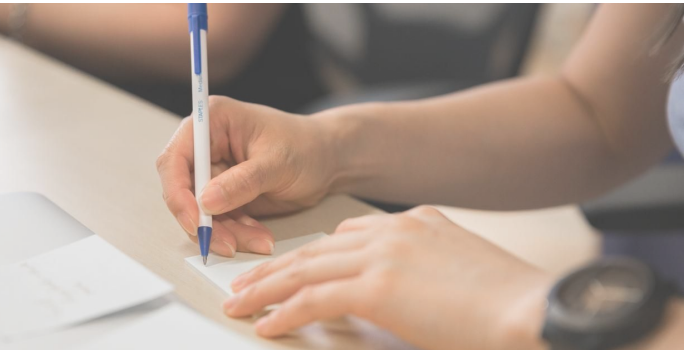
Interested in data visualizations , analysis and Machine Learning. When I am not coding Angular, I usually play around with applications making use of Scala, Spark and Machine Learning.

Anna Karpacheva

Business Quality Analyst

Anna is passionate about data, visualization and Big Data technologies. She likes to make sense of data flow, user experiences and the outcomes useful for business development.

Prior to Rangle Anna was involved in Big Data Project for Wealth Management in one of the largest bank in Canada and was a member of Oracle/Eloqua Business Intelligence team.



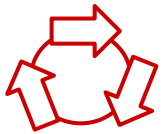
What if you could:

- Know your customer
- More conversions
- Easily capture analytics data and switch analytics tools
- Automate parts of the analytics process

All leading to

- Saving Time
- Delivering more Business Value

Flow Build Measure Machine Learn with Angular

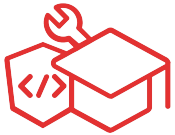


Build Measure Learn

Simple Tracking

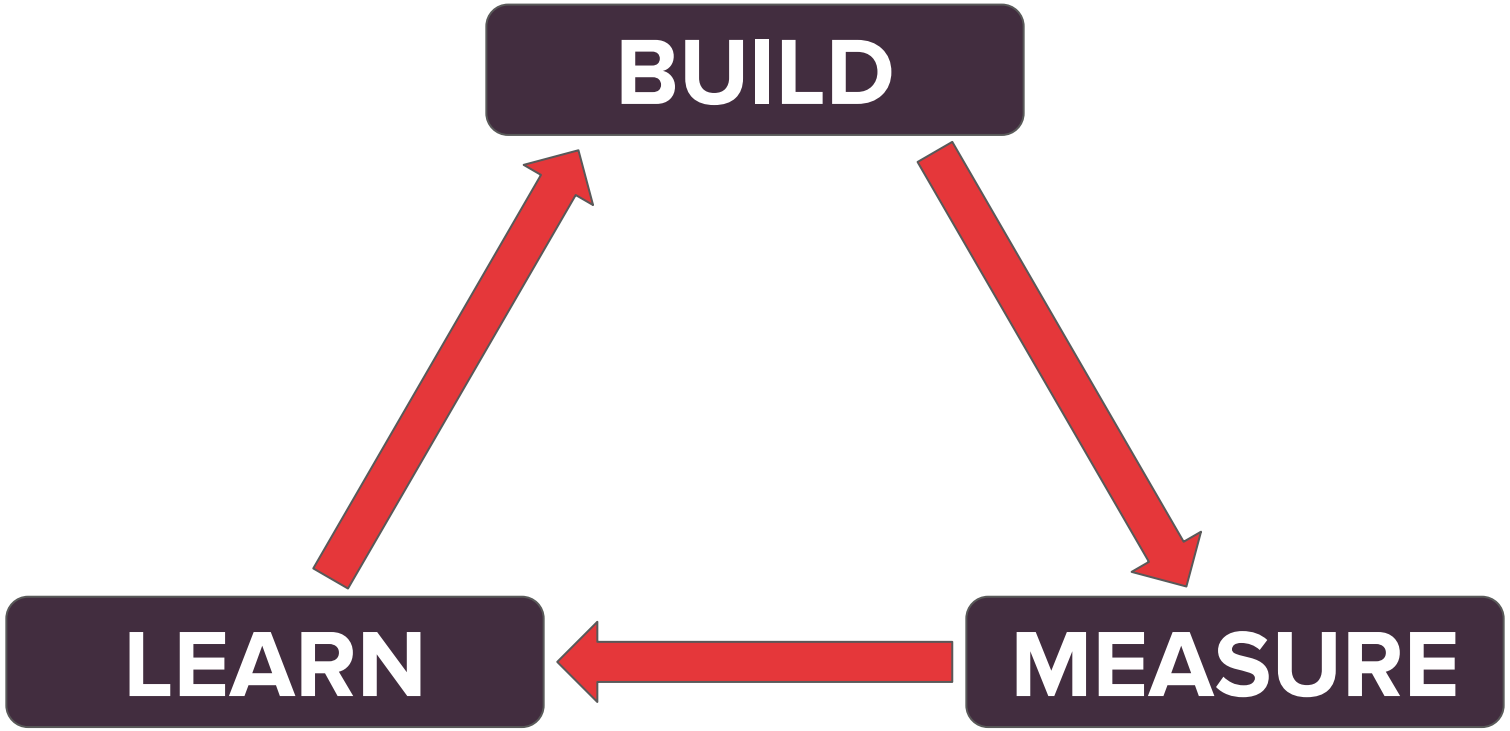
AB Testing

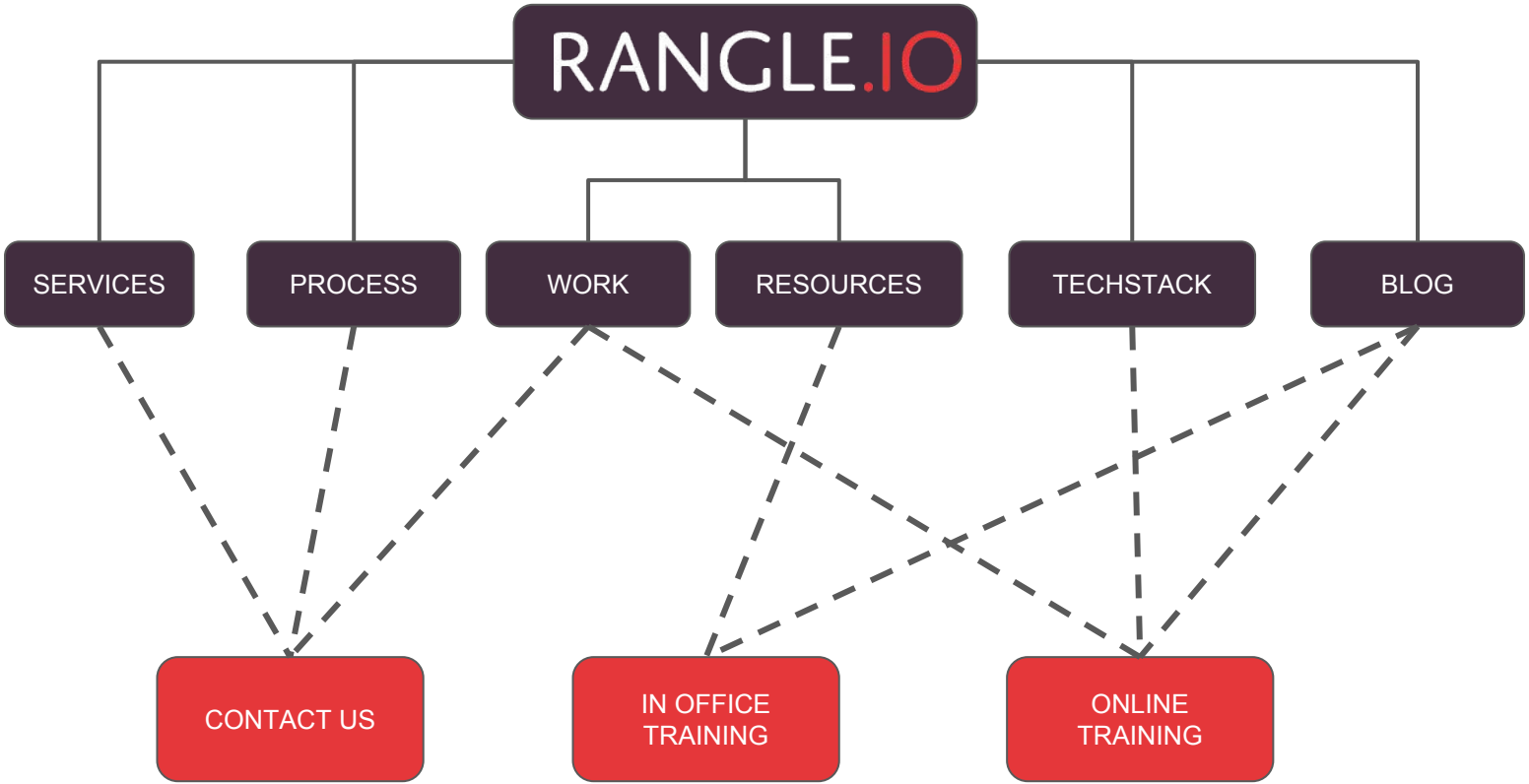
Personalization



Machine Learning

Resources


BUILD
MEASURE
LEARN


RANGLE.IO
SERVICES
PROCESS
WORK
RESOURCES
TECHSTACK
BLOG
CONTACT US
IN OFFICE TRAINING
ONLINE TRAINING

RANGLE.IO

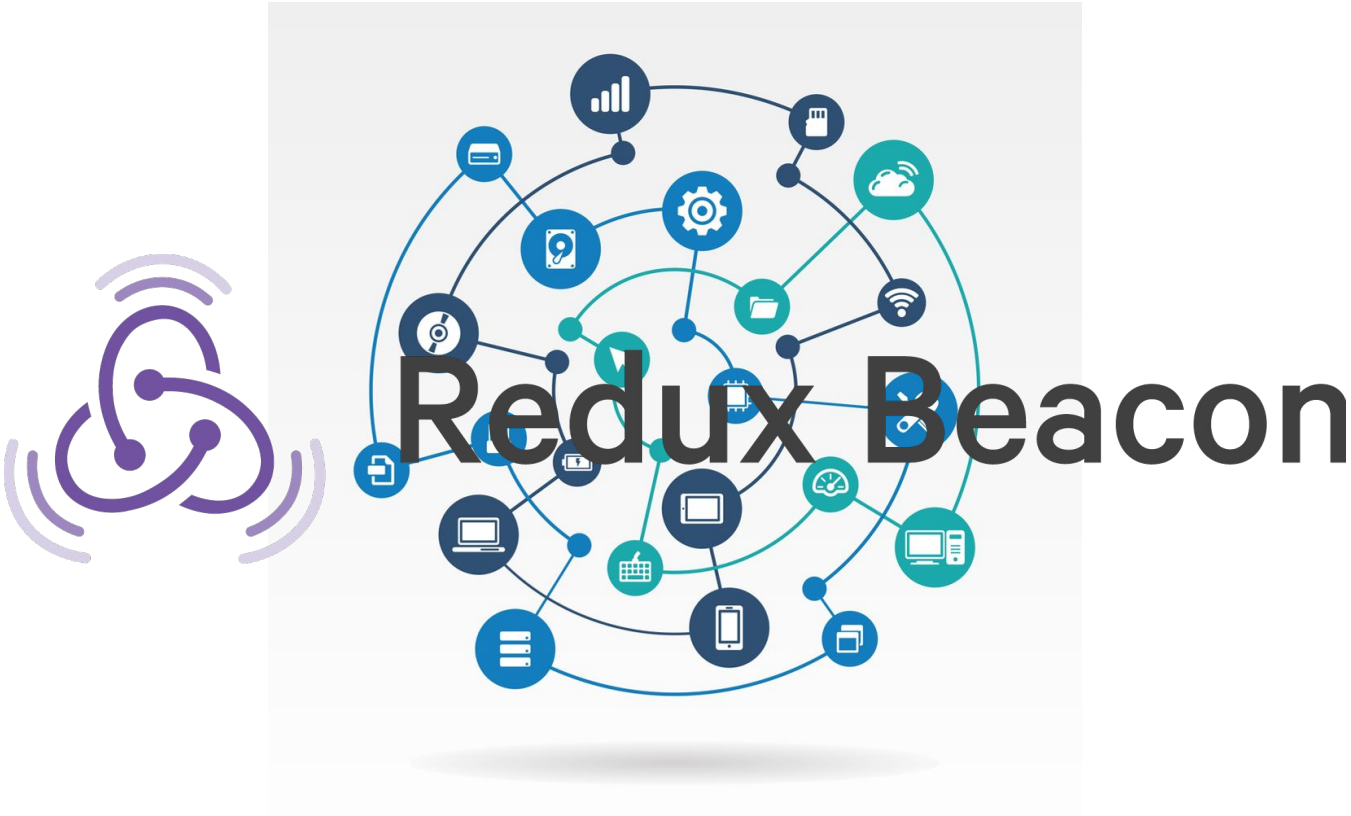
SET ASIA MOCK IP

SET CANADA MOCK IP

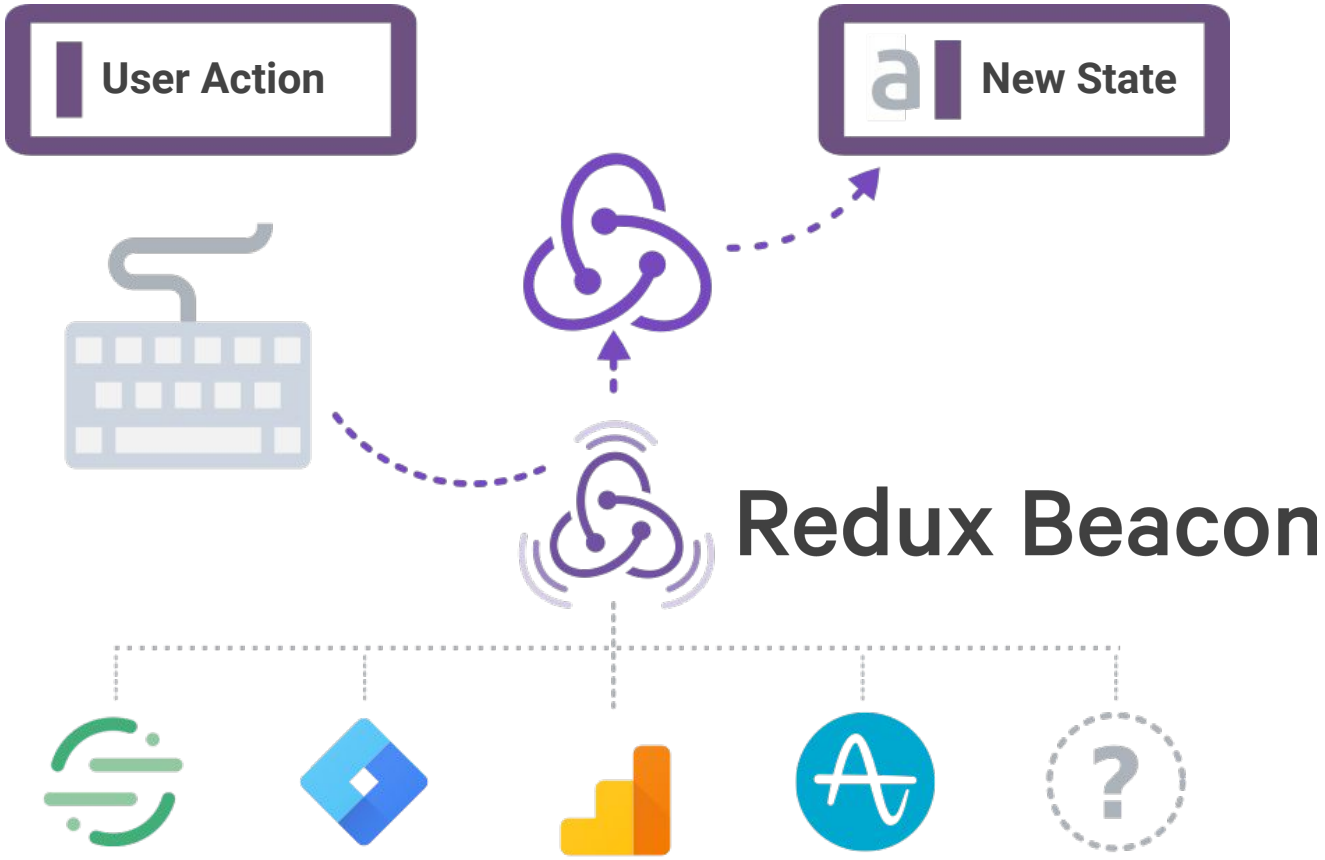
SERVICES PROCESS WORK RESOURCES TECHSTACK BLOG

Process

Contact Us



Redux Beacon


User Action
New State
Redux Beacon
?

Redux Beacon

- ➔ Map Redux or ngrx actions and state to your analytics data model
- ➔ Centralize your analytics logic (keep action creators clean)
- ➔ Send analytics events to multiple targets (e.g. Google Analytics or your own custom endpoint)

```
// Define an event
const pageView = {
  eventFields: (action: Action): PageView => ({
    hitType: 'pageview',
    page: action.payload.path,
  }),
};

// Map the event to an ngrx/store action
const eventsMap = {
  '[Router] Update Location': pageView,
};

// Create the meta Reducer
const analyticsMetaReducer=
   createMetaReducer(eventsMap,
   GoogleAnalytics);
```

Feature Toggles

- ➔ Like *ngIf but controlled by a configuration file or cloud service
- ➔ Manage switch state in config files or cloud service
- ➔ If statements in code or inversion of control/strategy design pattern
- ➔ Supports branch based development & avoid big destabilizing merges
- ➔ AB Tests, Canary Releases

```
<button
 *ngIf="feature1"
 className="bg-black col-2">
 ...
</button>

export const featureToggleConfigs:
IFeatureToggleConfigSet = {
  'feature1': {
    setting: false,
    responsible: 'Fred Blogs',
    Description: 'A of AB Test',
    shouldExpireAt: new Date('2020-08-10'),
  }
};
```

AB Testing

Almost anything on your website that affects visitor behavior can be A/B tested.

What can you test?

- ➔ Headlines
- ➔ Paragraph Text
- ➔ Call to Action Text
- ➔ Colors
- ➔ Images
- ➔ Entire Flows
- ➔ Major Features

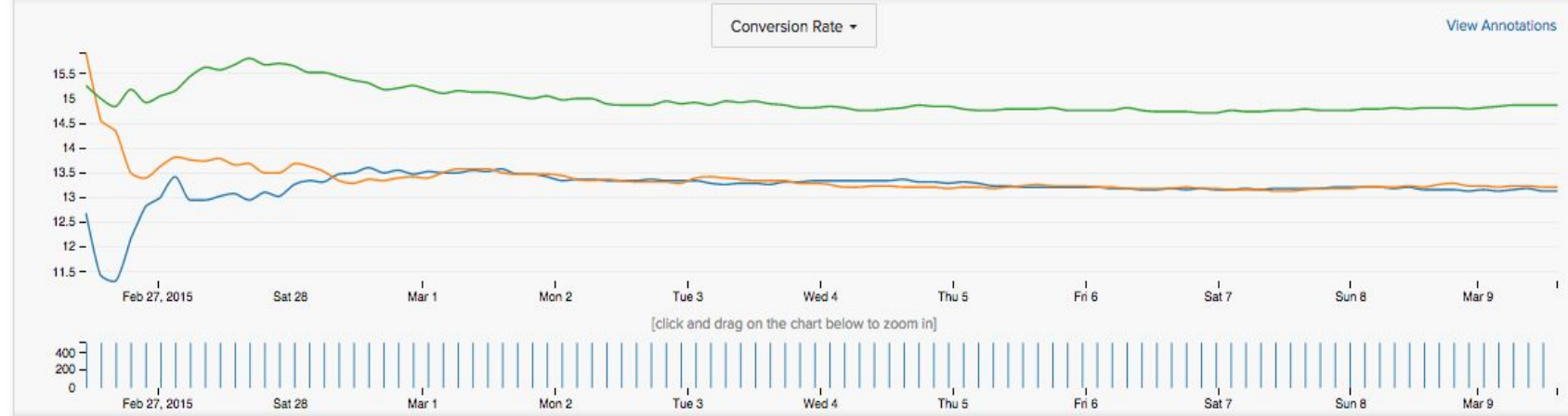
Clicked Learn More

The percentage of visitors who clicked on a tracked element.

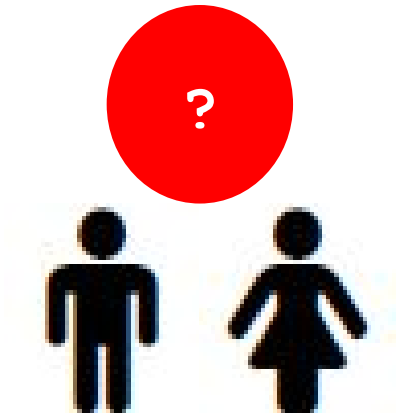
Hide Chart

Text CTA is currently beating Original.

Launch...



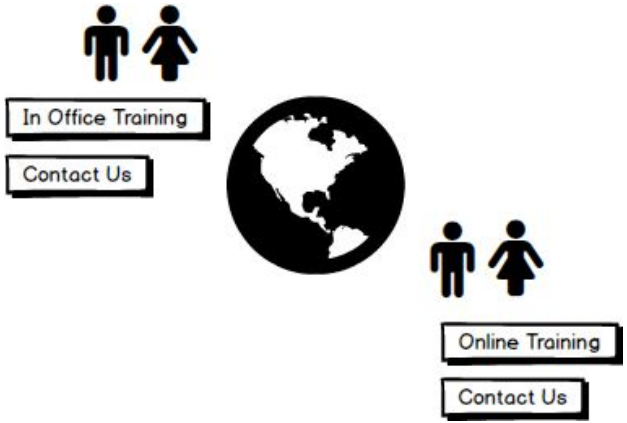
VARIATION	UNIQUE CONVERSIONS VISITORS	CONVERSION RATE	DIFFERENCE INTERVAL	IMPROVEMENT	STATISTICAL SIGNIFICANCE STATUS
Original	6,726 51,179	13.14%	---	---	--- baseline
Pop-Up	6,720 50,902	13.20%	0 -0.38 - 0.76	+0.5%	78% ~ 100,000 visitors remaining.
Text CTA	7,591 51,038	14.87%		+13.2%	>99% winner



Landing Page	Country	Acquisition		
		Sessions ↓	% New Sessions	New Users
		18,054 % of Total: 100.00% (18,054)	62.68% Avg for View: 62.68% (0.01%)	11,317 % of Total: 100.01% (11,316)
1. /	Canada	**847** (4.69%)	65.41%	554 (4.90%)
2. /	United States	**434** (2.40%)	72.58%	315 (2.78%)
3. /	Russia	**419** (2.32%)	50.84%	213 (1.88%)
4. /observables-and-reactive-programming-in-angular-2/	United States	**324** (1.79%)	67.90%	220 (1.94%)
5. /dynamically-creating-components-with-angular-2/	United States	**306** (1.69%)	50.98%	156 (1.38%)
6. /angular-2-ngmodel-and-custom-form-components/	United States	**249** (1.38%)	56.22%	140 (1.24%)
7. /mobile-world-congress-2017-contest	United Kingdom	**210** (1.16%)	92.86%	195 (1.72%)
8. /	India	**203** (1.12%)	61.58%	125 (1.10%)
9. /dynamically-creating-components-with-angular-2/	India	**189** (1.05%)	59.79%	113 (1.00%)
10. /observables-and-reactive-programming-in-angular-2/	India	**187** (1.04%)	60.96%	114 (1.01%)

Personalization

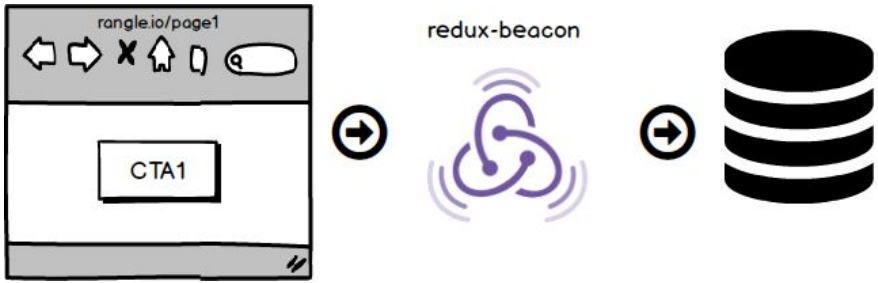
- ➔ Understand your audience
- ➔ Personalize the experience based on your learning
- ➔ More optimal then A or B for everyone




```
private countryToCTA(countryCode: string): string {
 switch (countryCode) {
   case 'CA':
   case 'US':
      return 'in-office-training';
   default:
      return 'online-training';
 }
};
this.ipInfo.getIPInfo(ip).subscribe(ipData => {
  this.featureToggleActions.toggleFeatureSetting(
    {cta: this.countryToCTA(ipData.countryCode)});
});
...
@Component({
 selector: 'call-to-action',
 template: `
   <button
     <div *showIfFeature="'cta===contact-us">
       Contact US
     </div>
     <div *showIfFeature="'cta===online-training">
       Online Training
     </div>
     <div *showIfFeature="'cta===in-office-training'">
       In Office Training
     </div>
   </button>
 `
});
```

Machine Learning

- ➔ Custom redux-beacon target
- ➔ Sends Raw data set
- ➔ Saving to database




```
export const analyticsMiddlewareCustom =
createMetaReducer(eventsMap, sendEvents);
function sendEvents(events) {
  events.forEach((event) => {
    analyticsSubject.next(event);
  });}

export const analyticsSubject: Subject<any> = new
Subject();
analyticsSubject.subscribe(this.sendEvent.bind(this));
sendEvent(event: any) {
  const ip = this.sessionService.getCookie('ip');
  event.sessionId =  this.sessionService.checkSession();
  event.ip = ip;
  this.http.post(`${this.API_PATH}`, event)
    .map(r => r.json())
    .subscribe((data) => {
      this.store.dispatch(new
          actions.PredictionReceived(data));
    }); }
```

Session Data Summarized for Machine Learning

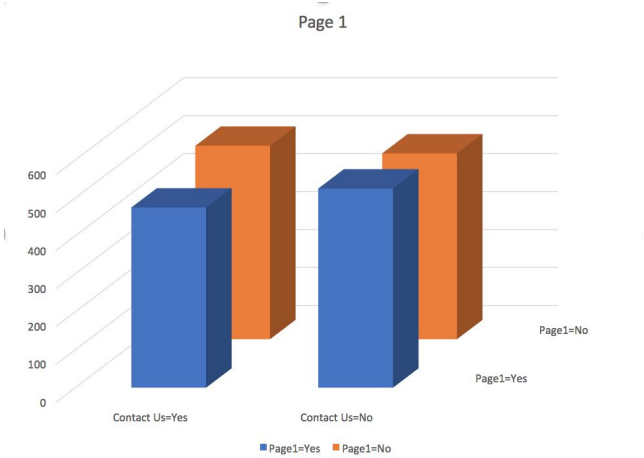
1	services	process	work	resources	tech-stack	blog	country	online-training	inoffice-training	contact-us
2	1	0	0	0	0	0	CA	0	0	1
3	0	0	0	0	0	2	CA	0	1	0
4	1	0	0	0	0	0	FR	0	0	1
5	0	0	0	0	1	1	CA	0	1	0
6	2	1	2	0	0	0	CA	0	0	1
7	0	0	0	2	1	1	FR	1	0	0
8	0	0	0	0	2	0	CN	1	0	0
9	0	0	1	0	0	0	CN	0	0	1
10	1	2	2	0	0	0	GB	0	0	1
11	1	1	1	0	0	0	CN	0	0	1
12	0	0	0	0	0	2	CN	1	0	0
13	3	1	1	0	0	0	AU	0	0	1
14	1	2	1	0	0	2	CA	0	1	0
15	1	0	0	0	0	0	AU	0	0	1
16	0	0	2	0	0	1	CA	0	0	1

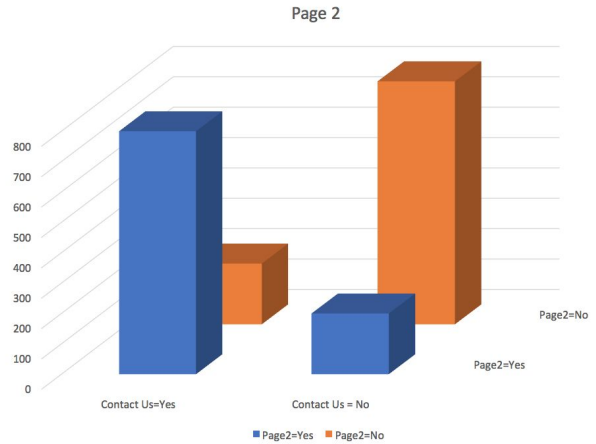
Session ID

Independent Variables (what to predict with)

Dependent Variables (what to predict)

How Does Machine Learning Work?





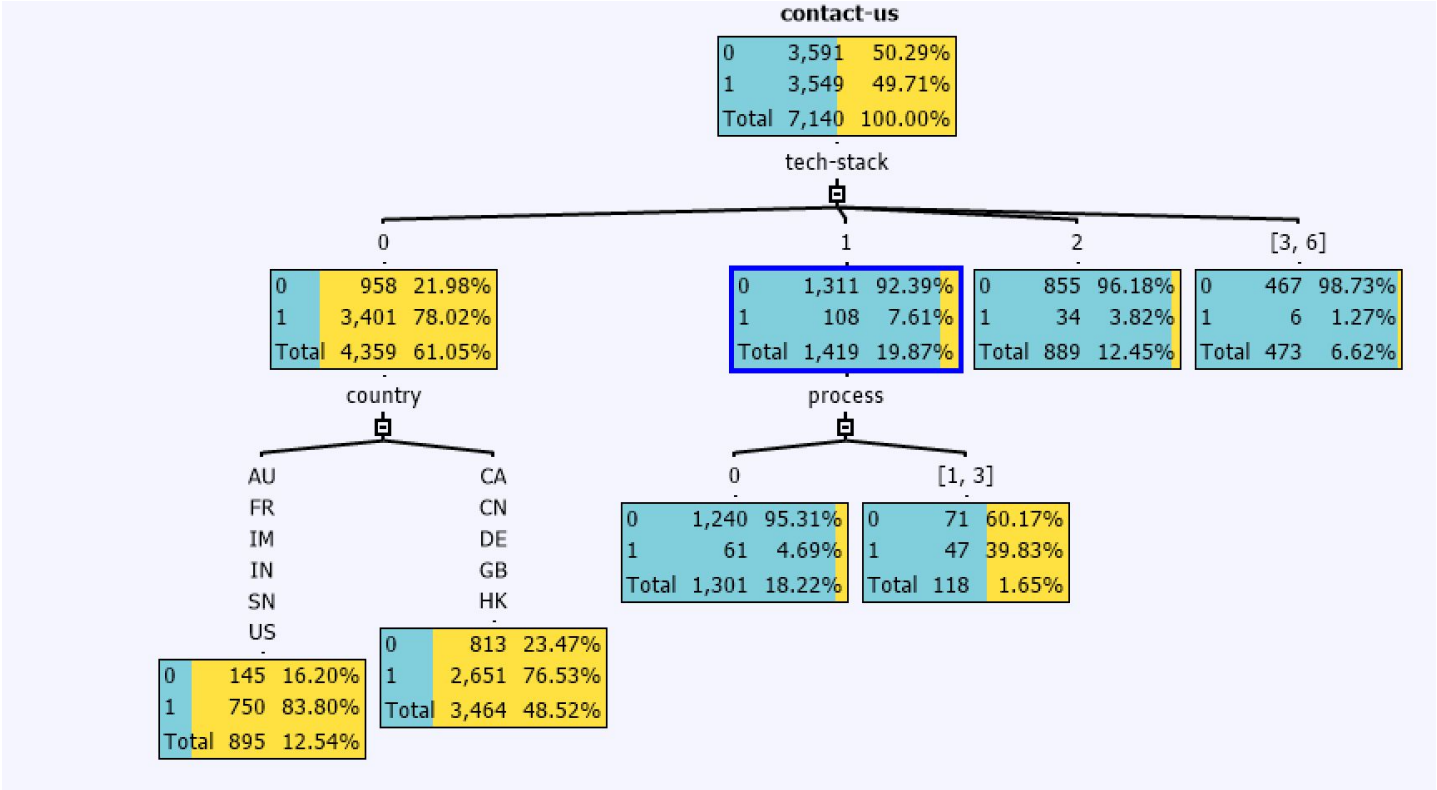
No correlation between Contact Us & Page 1

Strong correlation between Contact Us & Page 2

If User Visited Page 2, then probability of Contact Us is higher

Repeat to make more and more rules

Deploying Machine Learning (a.k.a scoring)



Demo

Machine Learning Recap

- ➔ Save the data
- ➔ Convert that data to vectors
- ➔ Train the predictive model
- ➔ Generate the rules
- ➔ Do the predictions :)

Recurrent Neural Networked Generated Code

```
/*
 * Increment the size file of the new incorrect UI_FILTER group information
 * of the size generatively.
 */
static int indicate_policy(void)
{
  int error;
  if (fd == MARN_EPT) {
    /*
     * The kernel blank will coeld it to userspace.
     */
    if (ss->segment < mem_total)
      unblock_graph_and_set_blocked();
    else
      ret = 1;
    goto bail;
  }
  segaddr = in_SB(in.addr);
  selector = seg / 16;
  setup_works = true;
  for (i = 0; i < blocks; i++) {
    seq = buf[i++];
    bpf = bd->bd.next + i * search;
    if (fd) {
      current = blocked;
    }
  }
  rw->name = "Getjbbregs";
  bprm_self_clearl(&iv->version);
  regs->new = blocks[(BPF_STATS << info->historidac)] | PFMR_CLOBATHINC_SECONDS << 12;
  return segtable;
}
```

Wrap Up & Resources

Redux-beacon for developers to integrate with any analytics tool

https://github.com/rangle/redux-beacon

Feature toggles & directives

https://github.com/rangle/feature-toggle-ng2-redux

AB Testing & Segmentation Analytics

Google Analytics • Google Optimize • Optimizely • Launchdarkly

AI Code Generator

http://karpathy.github.io/2015/05/21/rnn-effectiveness/

Machine Learning Demo App

https://github.com/sumitarora/awesome-ai

https://github.com/sumitarora/awesome-ai-ui

Presentation Slides

https://github.com/sumitarora/build-measure-machine-learn

RANGLE.IO

Thank You