

Data is your
friend





Goal

Encourage adoption of data science for problem management.

“The goal is to turn data into information, and information into insight.” – *Carly Fiorina*



Finding problems

Customer reports calls are dropping.

Provider asks for call drop example and/or repro; provider isolates a fault and fixes a problem. Tell customer problem is fixed.

Example call drop is related to a destination in area code 646. Calls to other area codes are still dropping.

Return to customer report step.

“Always challenge the old ways.” – Howard Schultz



Another way

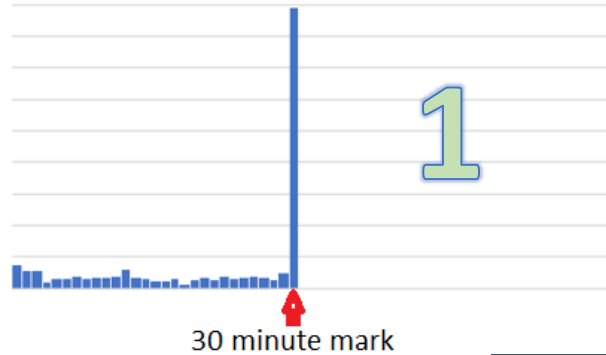
Build a picture through data. For every customer report, there may be hundreds more instances of the same issue going unreported.

Scope of impact can be better understood per customer, per country, per region.

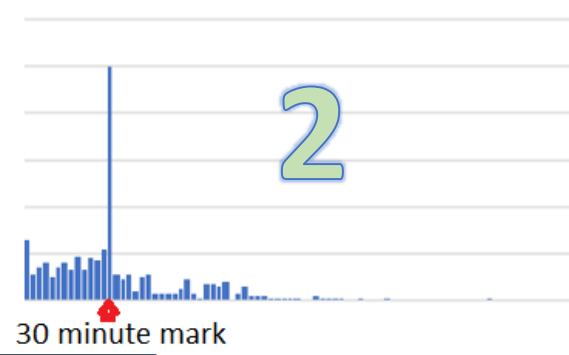
An accurate view of impact timing can be empirically measured.

“The task is.. not so much to see what no one has yet seen; but to think what nobody has yet thought, about that which everybody sees.” – *Erwin Schrodinger*

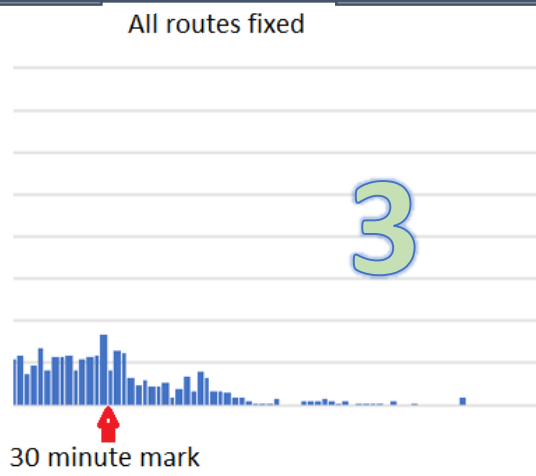
2 days before customer complaint



Partial fix implemented



All routes fixed



Minutes of modeling saves weeks of rebuilding customer confidence

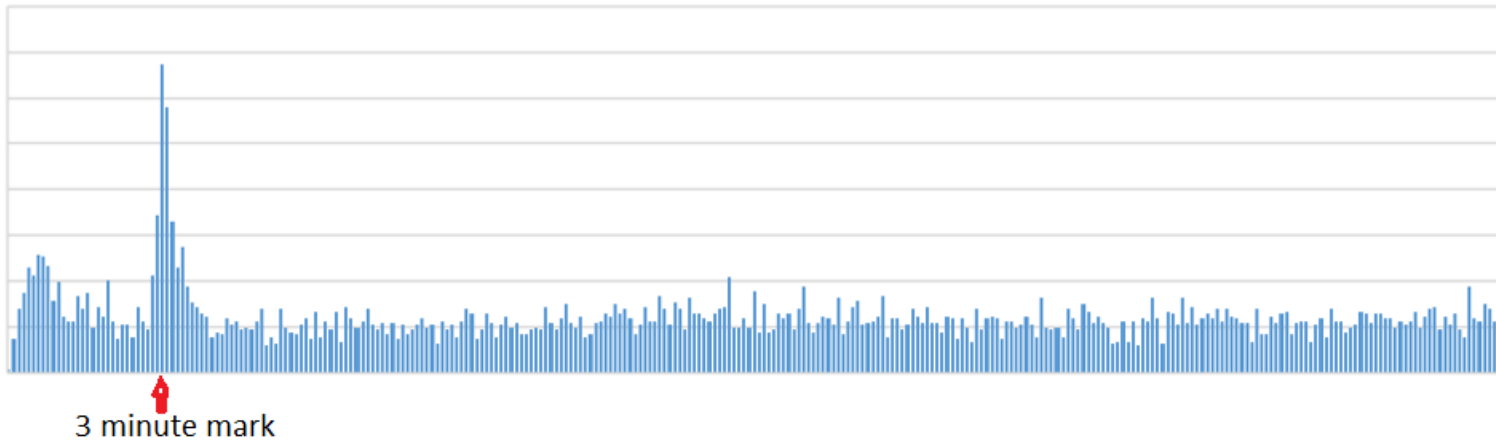


Mistakes –

- Waiting for complaint.
- Assuming complaint data was enough to scope investigation.
- Not using data to validate complaint or fix.

"Mistakes are the usual bridge between inexperience and wisdom."
- Phyllis Grissim-Theroux

Timer bug



Find bugs

Change = new bugs.

Bug in RTP inactivity timer terminating sessions where media isn't flowing (but RTCP is) at 3-minute mark.

Problem reports trickled in for weeks before the inspection of the data expedited diagnosis.

“The only thing that is constant is change.” - Heraclitus



The basics

Study data patterns and outliers, be curious.

Analyze examples within the outlier data to understand the problem fully.

Averages alone are not super helpful in large, diverse, and complex systems. Focus on 3 to 4 standard deviations for trends and 95th+ percentile for watermarks.

*“Research is formalized curiosity. It is poking and prying with a purpose.”
– Zora Neale Hurston*



NO SIGNAL

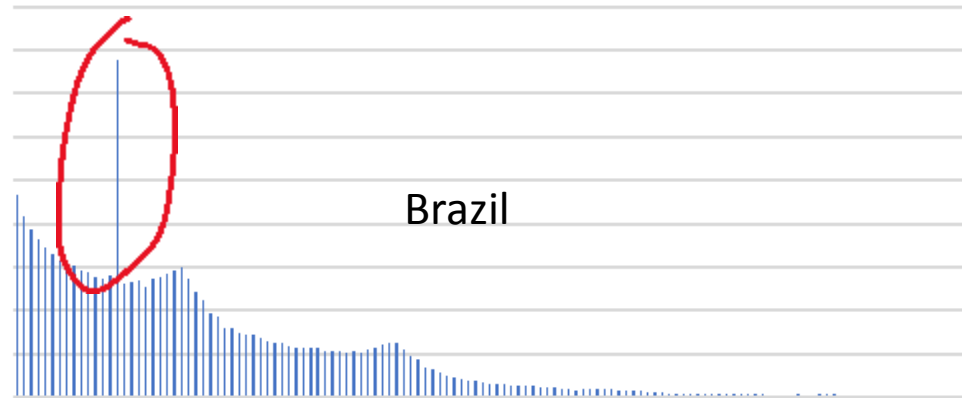
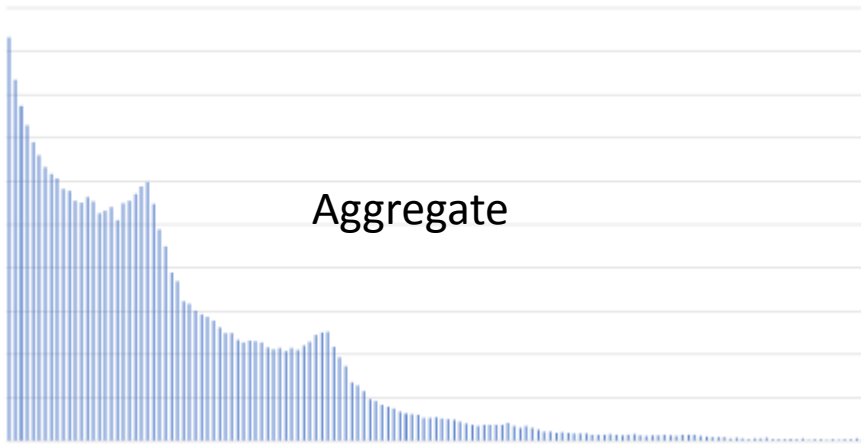
Find good signals

Give thought to desired insights and prove out strong signals for the perspective you want.

- Reputation broken out at market, carrier, device, so forth (e.g. heatmap).
- Customer experience (e.g. can't join conference).
- Service scenario (e.g. outbound vs inbound conference calls).

Weed out signal pollutants. (e.g. error codes attributed to the wrong system element)

*“The signal is the truth. The noise is what distracts us from the truth.”
– Nate Silver*



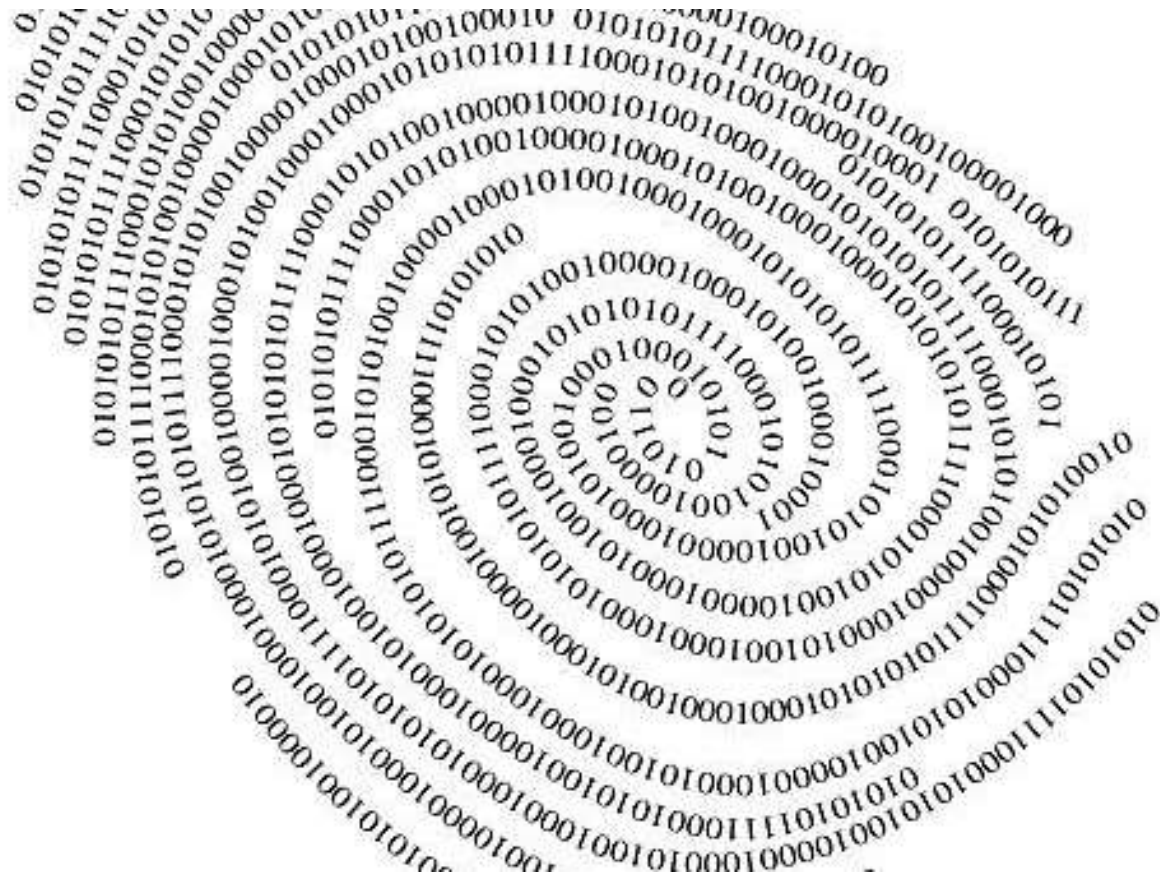
Scope matters

Service aggregate views can hide problems.

When view is scoped to Brazil destinations, a spike of calls ending at precisely 15 minutes is easily observed.

With the Brazil view one can quickly flag a problem, isolate problematic routes, destinations, etc for investigation.

“Turn things around sometimes and look at life from a different perspective.” - *Jean Wilson*



Find new signatures, apply them to your analysis

Scenario –

New headsets were distributed to a large enterprise. Customer complained PSTN calls were randomly dropping.

Data signature -

BYE from users in one enterprise within the context of a given conference, followed by reconnect(s) from same device.

“There are only patterns, patterns on top of patterns, patterns that affect other patterns. Patterns hidden by patterns. Patterns within patterns.” – *Chuck Palahniuk*



Another Dimension

Attestation

Calls with B/C/NA attestation are answered how often?

When answered, are they short duration?

Calls with A attestation are answered how often?

When answered, how does duration compare to B/C/NA rates?

How might scope matter? Carrier, Customer, Source NPA-NXX, etc

“To understand is to perceive patterns.”

–Isaiah Berlin



Let data disprove your
hypothesis

Scenario –

26% of calls to a conferencing service never enter DTMF.

Hypotheses –

Device support issue, war-dialing wake, mis-dialed numbers, and so forth.

Use empirical data to work towards disproving (vs proving) each hypothesis.

In that exercise the data may unearth new hypotheses.

“Our hypotheses are initially rooted in theoretical consistency and elegance, but...ultimately it is experiment, not rigid belief, that determines what is correct.” – *Lisa Randall*



Large deviations are not
always a problem

Scenario –

Significant shift in a type of traffic;
one conclusion is Europe based
traffic dropped 15% - oh no,
something is wrong!

Reason –

Customer began using US based
numbers.

Be mindful when connecting data
trends up to alarms. Don't wake up
on call engineers because traffic
dipped during week of Thanksgiving.

*“Facts can be so misleading...” –
Christoph Waltz*



Surprise and delight your
customers

Scenario –

Apply historical data for porting failures to proactively manage customer expectations.

Applying data –

Insight from outside in automated testing for new ports shows 10% of ports from carrier X don't get pushed out to 5% of their switches, typically affecting calls from a,b,c areas.

“Every day we're saying, ‘How can we keep this customer happy?’ How can we get ahead in innovation by doing this’, because if we don't, somebody else will. – *Bill Gates*”



Common Pitfalls

Persistent/Automated dialers

Percentage based alerts

Customer behavior

Poisonous data (i.e. false signal)

“The more thou dost advance, the more thy feet pitfalls will meet.” – H.P. Blavatsky



Call to action

Visualize your service data, slice and dice it for different perspectives.

Make time, be curious.

“One can remain alive ... if one is unafraid of change, insatiable in intellectual curiosity, interested in big things, and happy in small ways.”
– *Edith Wharton*

FIN

"The greatest value of a picture is when it forces us to notice what we never expected to see." – *John Tukey*



russp@microsoft.com