Is my QA process successful?

"Decide it with Metrics"

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Agenda

Introduction

Necessity

Benefits

Metrics

Optimization

Customization

Categories

Hazardous Metrics

Practical Application

Summary

Introduction

Why should we use metrics?

Answers to questions

- How long will it take to test?
- How much money will it take to test?
- How bad are the bugs?
- How many bugs found were fixed, reopened, closed, deferred?
- How many bugs did the test team did not find?
- How much of the software was tested?
- Will testing be done on time?
- Can the software be shipped on time?
- How effective were the tests?
- Are we using low-value test cases?
- What is the cost of testing?
- Was the test effort adequate?
- Could we have fit more testing in this release?

Further Implications

- Take decision for next phase of activities
- Evidence of the claim or prediction
- Understand the type of improvement required
- Take decision or process or technology change

Quality Metrics

Optimization of Metrics

How to select best to get an idea about success

- Passed test case percentage
- Failed test case percentage
- Blocked test case percentage
- Test Case Productivity
- Total number of test cases
- Number of tests run per time
- Test Design Efficiency
- Test Review Efficiency
- Average time to test a fix/feature
- Average time to test the full set
- Rework Ratio
- False Alarm Ratio
- Automation Rate
- Bugs found after release ratio
- Bug find rate
- Number of bugs per test
- Defects per Requirement
- Mean Time Between Failures (MTBF)
- Defect Removal Efficiency
- Fixed defects percentage
- Accepted defects percentage
- Distribution by age
- Critical Defects Percentage
- Defect Severity Index (DSI)
- Defect Resolution Time
- Requirement coverage percentage
- Test Cases by Requirement
- Requirements without Test Coverage
- Total allocated costs for testing
- Actual cost of testing
- Budget variance
- Schedule Variance
- Bugs found by tests ratio
- Bugs found by review ratio
- Defects rejected percentage
- Deferred defects percentage
- Execution coverage percentage

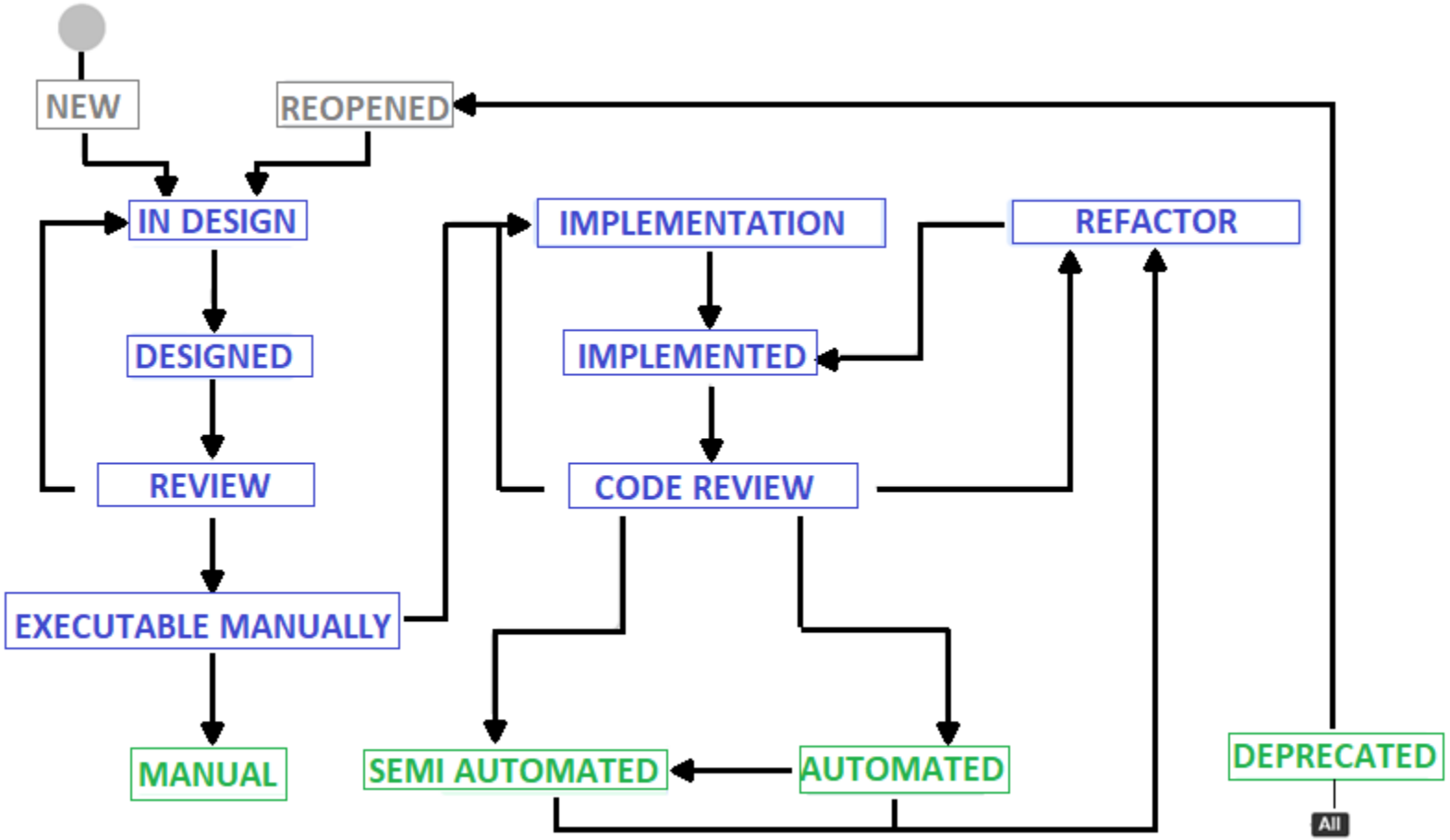
Did I choose the best metrics?

- Correlation
- Consistency
- Tracking
- Predictability
- Discriminative power
- Reliability

Cem Kaner

Customization

Time Elapsed for each step in Test Design



Customization

We add a custom field for tracking

```
<title>AWS Mindsphere JIRA</title>
<link>https://jira.mindsphere-tools.siemens.cloud</link>
<item>
    <title>[QAGP-59] EventManagement: Create custom events in a
    <link>https://jira.mindsphere-tools.siemens.cloud/browse/QA
    <project id="11105" key="QAGP">QA - Gone productive</projec
    <description><p>Create cutom event types as admin user from
    from them.</p> <p> </p> <p>Hint for implementation: should
    <key id="51963">QAGP-59</key>
    <summary>EventManagement: Create custom events in all possi
    <type id="10800" iconUrl="
    https://jira.mindsphere-tools.siemens.cloud/download/resour
    <priority id="10301" iconUrl="https://jira.mindsphere-tools
    </priority>
    <status id="12006" iconUrl="https://jira.mindsphere-tools.s
    case automated and ready to execute it as code / script.">A
    <statusCategory id="3" key="done" colorName="green"/>
    <resolution id="-1">Unresolved</resolution>
    <assignee username="Z003DDNF">D, Mesut</assignee>
    <reporter username="Z00365FU">VG, Christina</reporter>
    <customfields>
        <customfield id="customfield_15301" key="com.atlassian.
            <customfieldname>Average Execution Duration</custom
            <customfieldvalues>
                <customfieldvalue>18.0</customfieldvalue>
            </customfieldvalues>
        </customfield>
    </customfields>
</item>
```


```
[
  {
    "id": 1,
    "iid": 1,
    "project_id": 3,
    "title": "test1",
    "description": "fixed login page css paddin
    "state": "merged",
    "merged_by": {
      "id": 87854,
      "name": "Douwe Maan",
      "username": "DouweM"
    },
    "merged_at": "2018-09-07T11:16:17.520Z",
    "closed_by": null,
    "closed_at": null,
    "created_at": "2017-04-29T08:46:00Z",
    "updated_at": "2017-04-29T08:46:00Z",
    "target_branch": "master",
    "source_branch": "test1",
```

Time

- Average time to test a fix/feature
  - Blocking fast release: not success
- Average time to test the full set
- MTTF, MTBF
- Mean Defect Resolution Time
  - Defect distribution by age
- Schedule slippage

$$\frac{\text{(Actual end date – Estimated end date)}}{\text{(Planned End Date – Planned Start Date) X 100}}$$

Cost

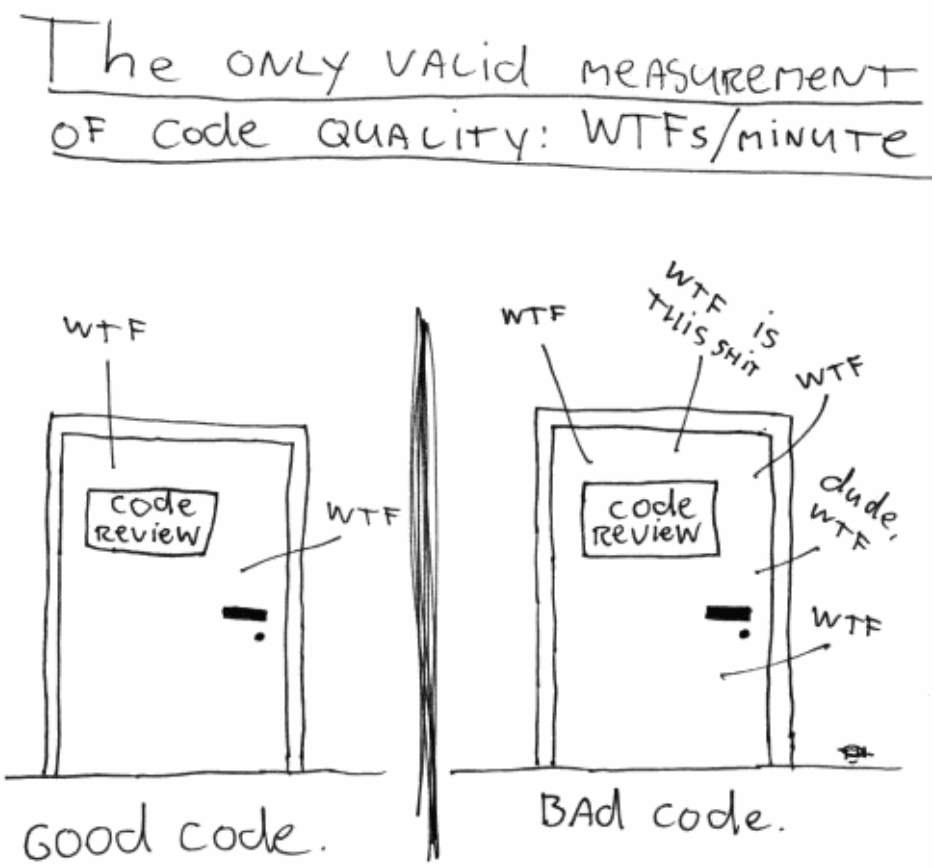
- Total allocated cost
  - How many people are you allocating for QA?
  - Other resources
- Execution costs
  - Too many executions: AWS cost. (Stability)
- Cost for tools/licenses
- Budget variance

Quality

- Test Cases Status (Passed/Failed/Blocked test case percentage)
- Defects per requirement
- Defects status (Fixed Ratio)
- Defects severity distribution (Critical / total)
  - Defect Severity Index (DSI) = (Defect * Severity Level) / Total defect number
- Non-functional aspects: performance, usability, compatibility

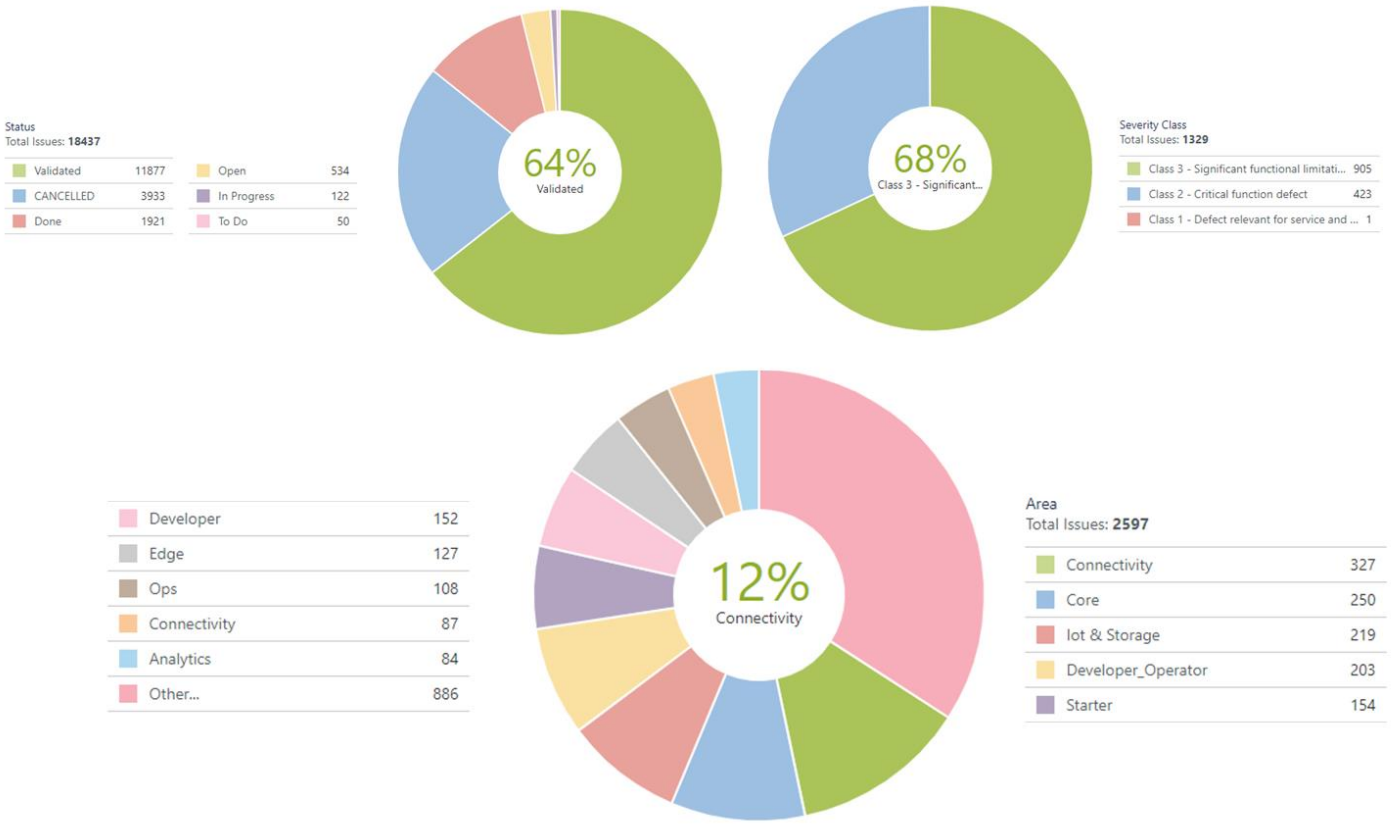
Inner Quality

- Method name length
- Method line length
- Code complexity
- Code coverage

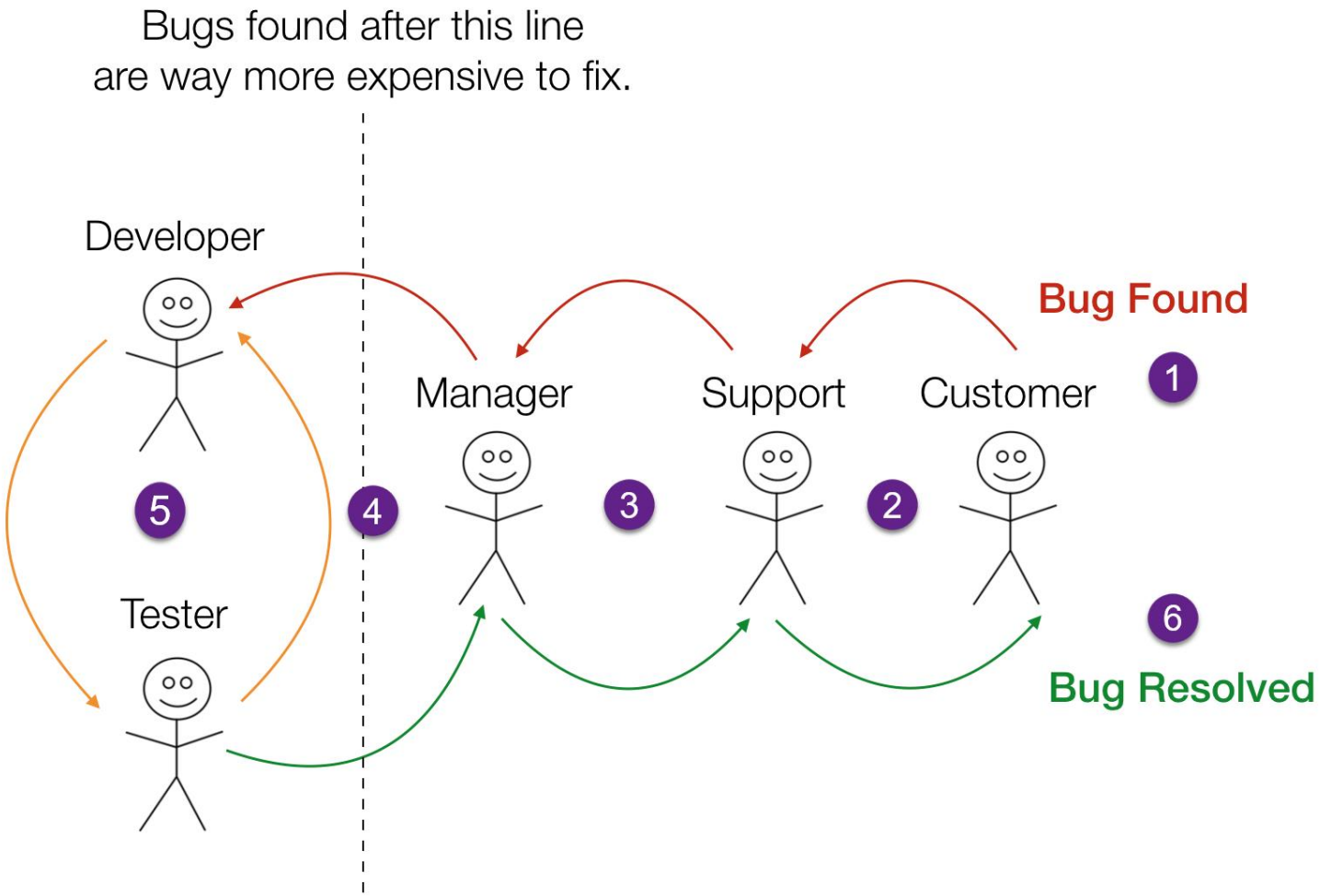


A Reference for Quality

Bugs



Escaped Bugs



by Dean Peters

Efficiency

- Productivity
  - Test Design Efficiency
    (nr of test designed / time)
  - Test Review Efficiency
    (nr of test reviewed / time)
  - Test execution efficiency
    (nr of test run / time)
  - Rework Effort Ratio
    (refactoring/new implementation)
  - False Alarm Ratio
- Maturity
  - Total number of test cases
  - Automation Rate
- Coverage
  - Test execution coverage
    (nr of test run / total test nr)
  - Requirement coverage
    (nr of requirements covered /
    total requirements)
  - Test case number per requirement
- Bugs
  - Distribution of bugs in stages
    (static code -> unit -> e2e -> customers!)
  - Density
    (total nr of defects / test case)
  - Defect acceptance rate
    (accepted / total)

This time:

Emotional Metrics

- Satisfaction
- Delight
- Pride
- Core Values
- Know-How
- Cultural Memory

Hazardous Metrics

- Story points
- Bug number
- Anything that is strict count

Practical Application

Practical Application

Automatically Collect Metrics over Jira Continuously

```
public HashMap<String, Long> measureDefectResolutionDurationPerArea() {
    String jql = "type = Bug AND status in (Validated) AND creator in " + reporterList + " and area = ";

    ArrayList<String> suiteList = getSuiteList();
    HashMap<String, Long> defectResolutionDurations = new HashMap<String, Long>();

    for (String suite : suiteList) {
        Promise<SearchResult> searchJqlPromise = jiraRestClient.getSearchClient().searchJql(jql + suite, 1000, 0,
                null);
        SearchResult claim = searchJqlPromise.claim();
        int totalNumberOfBugsPerSuite = claim.getTotal();

        long totalResolutionDurationInHoursPerArea = 0;
        long avgResolutionDuration = 0;
        if (totalNumberOfBugsPerSuite != 0) {
            for (Issue issue : claim.getIssues()) {
                DateTime creationDate = issue.getCreationDate();
                LocalDateTime creationDateInLocalDateTime = LocalDateTime
                        .parse(creationDate.toString().substring(0, 23), DATETIMEFORMATTER);
                long creationDateInSeconds = creationDateInLocalDateTime.toEpochSecond(ZoneOffset.UTC);

                String resolutionDateInString = (String) issue.getFieldByName("Resolved").getValue();
                LocalDateTime resolutionDateInLocalDateTime = LocalDateTime
                        .parse(resolutionDateInString.substring(0, 23), DATETIMEFORMATTER);
                long resolutionDateInSeconds = resolutionDateInLocalDateTime.toEpochSecond(ZoneOffset.UTC);

                long diffInSeconds = resolutionDateInSeconds - creationDateInSeconds;
                long diffInHours = diffInSeconds / 3600;

                totalResolutionDurationInHoursPerArea = totalResolutionDurationInHoursPerArea + diffInHours;
            }
```

"totalNumberOfBugsPerSuite"= 94

94

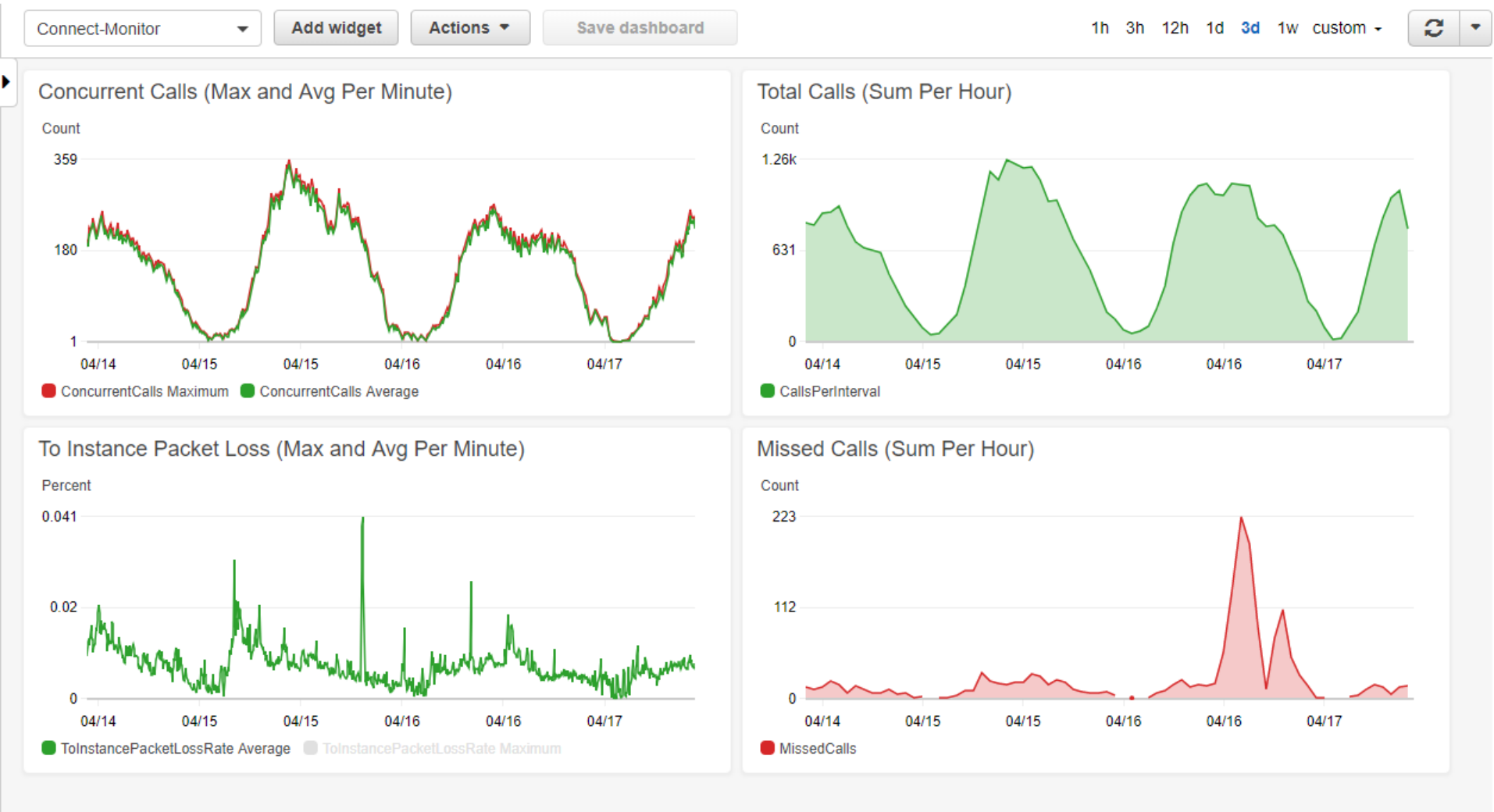
Practical Application

Not to lose any data: Upload all to Cloudwatch

```
logger.info("Read Credentials over config file and Connect");
AmazonCloudWatch cw = new CloudWatchHelper().getAwsCloudWatch();

HashMap<String, Integer> myMap = new HashMap<String, Integer>();
myMap.put("Alice", 52);
myMap.put("Bob", 53);
myMap.put("Mesut", 54);
myMap.put("Ahmet", 55);

for (Map.Entry<String, Integer> entry : myMap.entrySet()) {

    String key = entry.getKey();
    Double value = entry.getValue().doubleValue();

    Dimension dimension = new Dimension().withName("Children").withValue(key);
    MetricDatum datum = new MetricDatum().withMetricName("Their Notes").withUnit(StandardUnit.None)
            .withValue(value).withDimensions(dimension);

    PutMetricDataRequest request = new PutMetricDataRequest().withNamespace("Notes of Children in My Class")
            .withMetricData(datum);

    cw.putMetricData(request);

}
```

Practical Application

Use Dashboards for Monitoring: Grafana



CONCLUSION


NEWS
FORUM
SOCIAL NETWORK
CONTENT SHARING
MICROBLOGS
SOCIAL MEDIA
VIDEO
EMAIL
COMMUNICATION
CHAT
PICTURE
SMS
OUR BUSINESS
IDEA
YES
?
FIREWALL
SERVER FARM
INTERNET
COMPANY HEADQUARTERS
GROWTH
STATISTICS
LAST YEAR
THIS YEAR
35%
TIME
MONEY
BUSINESS
QUALITY
ROUTER
QUALITY
STRATEGY
VISION
SUCCESS
INNOVATION
VISION
RESEARCH
SOCIAL NETWORK

- Optimize
- Customize
- Categorize
- Hybridize
- Interpret


thank you
merci
danke
謝謝
gracias
teşekkür ederim
ngiyabonga
tapadh leat
dziękuję
bedankt
mauruuru
hvala
go raibh maith agat
sukriya
kop khun krap
terima kasih
dakujem
arigatô
takk
grazie
-taiku
sagolun
obrigado
спасибо
рахмат
Баярлалаа
dank je
misaotra
matondo
paldies
grazzi
mahalo
хвала
asante
obrigada
murakoze
chokrane
mamnun
дякую
mochchakkeram
djere dieuf
tau
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dankon
ačiū
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vinaka
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dhanyavad
gràcie
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köszönöm
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ありがとう
তোমাকে ধন্যবাদ
감사합니다
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