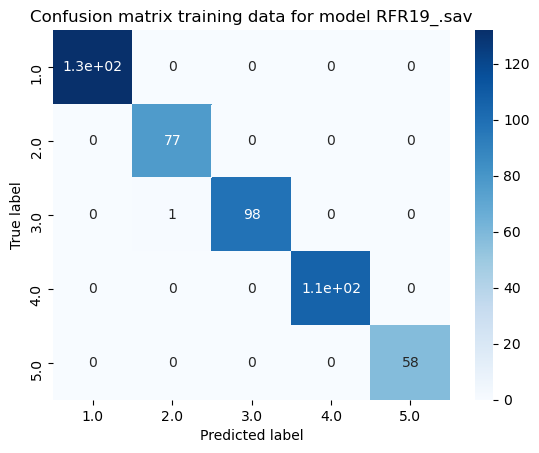
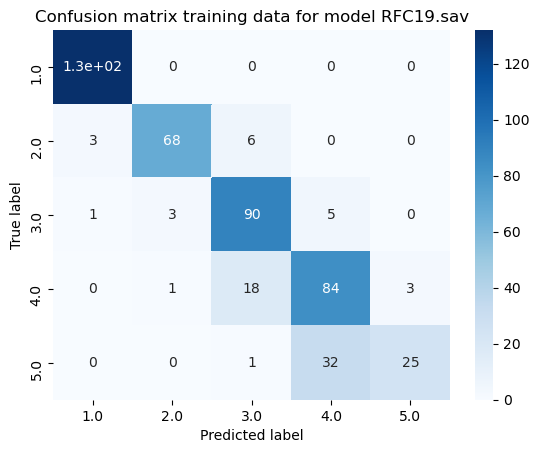
# Benchmark RFC19 model versus standard Random Forest Regressor

## Details

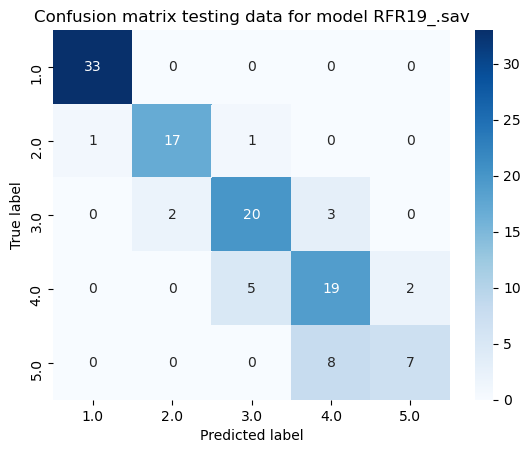
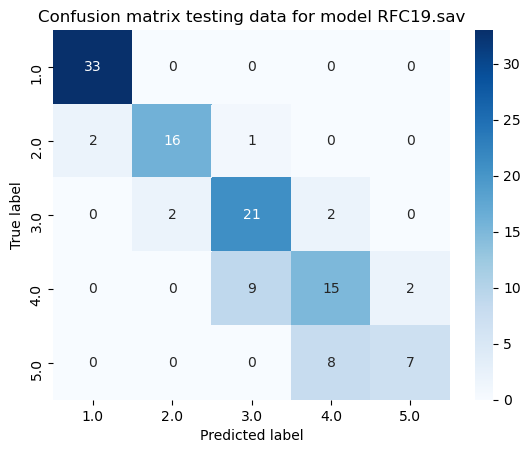
|  |  |  |
| --- | --- | --- |
|  | **Original** | **New** |
| **Dataset size** | 590 samples | 590 samples |
| **Nr. of features** | 19 features | 19 features |
| **Feature changes** | * MatchKans -> MatchProbability | * MatchKans -> MatchProbability * PercAF*locus* = nr. of known alleles at *locus* / total nr. of alleles at *locus* in AF file |
| **Model type** | Sklearn RandomForestClassifier | Sklearn RandomForestRegressor |
| **Model parameters** | As descibed in *Benschop et al.* | defaults |
| **Model name** | RFC19 | RFR19 |

## Model performance

Performance on training data



Performance on test data



The regression model performs almost perfectly on the training data (99% training accuracy). The classifier performance is a bit lower (85%), and predicts some profiles more than one class off. On the test set, the regressor obtains similar or better results than the classifier (81% test accuracy compared to 78%). Especially for profiles of 4 donors, we can see an improvement which is consistent over multiple runs. For profiles of 2, 3, and 5 donors, the number of correct predictions is on average the same for the classifier and the regressor. Multiple fits show that this varies by one or two both in favor of the classifier and the regressor.

The larger discrepancy between the train and test performance for the regressor is due to overfitting. The default parameters of the regressor in comparison to the optimized classification parameters are more tuned towards larger datasets, which explains this issue.

These results show promise that a regression model will outperform a classification model once put through more rigorous training, gridsearch, etc.

## Future feature engineering

For future feature engineering I would recommend a few changes from both a machine learning, and the DNA-experts’ perspective:

1. Remove features that are redundant. For example, MinNOC*locus* encodes the same information as AlleleCount*locus*.
2. Remove locus-specific features. The loci that are included in the 19 features appear to be the loci that most often have the MAC of the profile. It would be interesting to replace the 23 loci with the following:
   * Locus (/loci) with the maximum allele count of the profile
   * Locus (/loci) with the minimum allele count of the profile

The opinion of the users is that mostly profile-specific information is important. It is difficult to understand why certain loci are included in the current features and others not. This proposal might remove that confusion.

1. Make profile features complete. For instance, the 19 features now include the number of loci with 5 or 6 alleles, but not the number of loci with 7 or 8. Including the full range helps with consistency and understanding in explanations.
2. Add more information outside of the STR profile such as:
   * Number of peaks at stutter positions
   * Number of unnamed peaks (visible in epg)
   * Replicate runs
   * Major / minor contributors
   * The quality of certain channels

Some of these might be more viable and useful than others. They are ordered according to my expectation. Most of these were brought up by the users.

1. Keep MAC and TAC features since they are very familiar to the users and give context to the complete explanation. Additionally, the TAC values are variable among different kits, with which the users might not have experience with yet. Seeing the familiar variables with new values can help users get used to a new kit.

# Merging 5000 samples with the original 590

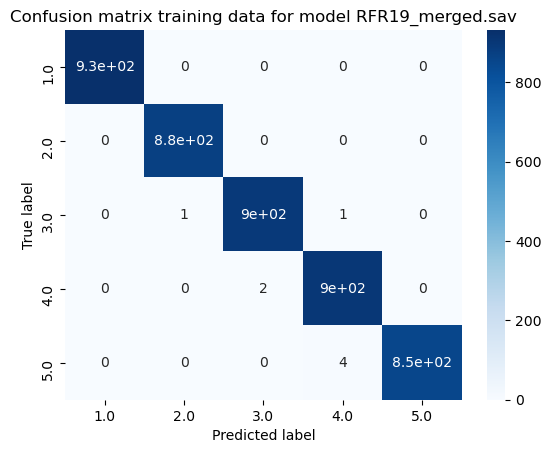
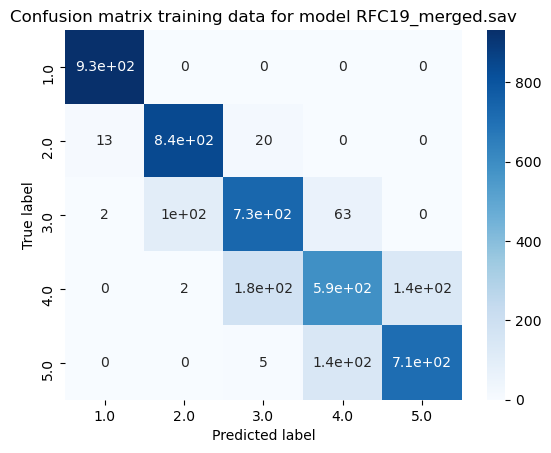
## Details

|  |  |  |
| --- | --- | --- |
|  | **Original\_merged** | **New\_merged** |
| **Dataset size** | 5590 samples | 5590 samples |
| **Nr. of features** | 19 features | 19 features |
| **Feature changes** | * MatchKans -> MatchProbability | * MatchKans -> MatchProbability * PercAF*locus* = nr. of known alleles at *locus* / total nr. of alleles at *locus* in AF file |
| **Model type** | Sklearn RandomForestClassifier | Sklearn RandomForestRegressor |
| **Model parameters** | As descibed in *Benschop et al.* | defaults |
| **Model name** | RFC19\_merged | RFR19\_merged |

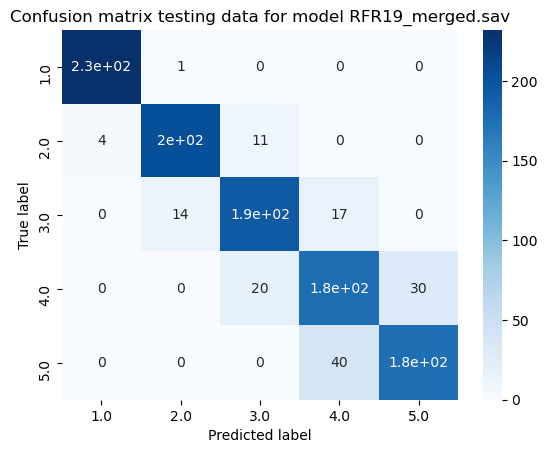
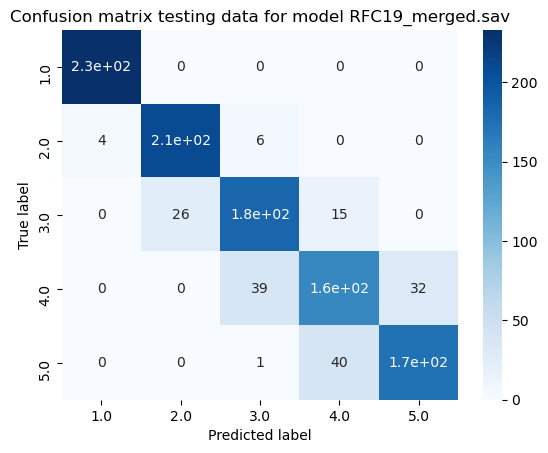
The models are re-trained on the new merged dataset.

## Model performance

Performance on training data



Performance on test data



Test data accuracy scores now lie at 85% for classification and 88% for regression.

## Check performance 590 vs 5000 with RFR19\_merged

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Total** | **From\_590** | **From\_5000** |
| **Samples in total** | 5590 | 590 (10%) | 5000 (90%) |
| **Samples in test set** | 1118 (20%) | 112 (10%) | 1006 (90%) |
| **Samples correctly classified in test set** | 984 (88%) | 96 (86%) | 888 (88%) |

This analysis shows that the regressor performs about equally well on samples that originated from the original 590 samples as from the 5000 samples, while improving the overall performance.

## Check performance 590 vs 5000 with RFC19\_merged

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Total** | **From\_590** | **From\_5000** |
| **Samples in total** | 5590 | 590 (10%) | 5000 (90%) |
| **Samples in test set** | 1118 (20%) | 112 (10%) | 1006 (90%) |
| **Samples correctly classified in test set** | 957 (85.5%) | 92 (82%) | 865 (86%) |

This analysis shows that the regressor performs about equally well on samples that originated from the original 590 samples as from the 5000 samples, while improving the overall performance.

The classifier has a seemingly bigger gap between the samples originating from the original 590 and the 5000.

RFR19\_merged

Misclassifications on training data:

|  |  |  |
| --- | --- | --- |
| **Profile** | **Prediction** | **Actual** |
| Run 1\_Trace 1613656896388 | 4.48 | 5.0 |
| 4.71 | 3.42 | 4.0 |
| Run 1\_Trace 1613628841674 | 4.49 | 5.0 |
| Run 1\_Trace 1613475833918 | 3.52 | 3.0 |
| Run 1\_Trace 1613664602313 | 4.39 | 5.0 |
| Run 1\_Trace 1613488038401 | 3.35 | 4.0 |
| Run 1\_Trace 1613653201487 | 4.28 | 5.0 |
| 3.34D | 2.35 | 3.0 |

Misclassifications on test data:

|  |  |  |
| --- | --- | --- |
| **Profile** | **Prediction** | **Actual** |
| 2A3.3 | 3.5 | 3.0 |
| Run 1\_Trace 1613475749114 | 1.5 | 1.0 |
| Run 1\_Trace 1613486306353 | 4.67 | 4.0 |
| Run 1\_Trace 1613690434008 | 4.37 | 5.0 |
| Run 1\_Trace 1613640261912 | 4.35 | 5.0 |
| Run 1\_Trace 1613475803424 | 2.57 | 2.0 |
| Run 1\_Trace 1613490921772 | 4.94 | 4.0 |
| Run 1\_Trace 1613489231530 | 3.46 | 4.0 |
| Run 1\_Trace 1613475848783 | 2.25 | 3.0 |
| Run 1\_Trace 1613486593772 | 4.54 | 4.0 |
| 3.66 | 2.02 | 3.0 |
| Run 1\_Trace 1613478755556 | 3.42 | 4.0 |
| Run 1\_Trace 1613564387194 | 4.19 | 5.0 |
| 4.11 | 4.76 | 4.0 |
| Run 1\_Trace 1613478183114 | 3.05 | 4.0 |
| Run 1\_Trace 1613487537066 | 4.59 | 4.0 |
| Run 1\_Trace 1613475964168 | 2.32 | 3.0 |
| Run 1\_Trace 1613480966641 | 4.82 | 4.0 |
| Run 1\_Trace 1613475942333 | 3.59 | 3.0 |
| Run 1\_Trace 1613475821715 | 3.62 | 3.0 |
| Run 1\_Trace 1613480671880 | 3.14 | 4.0 |
| Run 1\_Trace 1613611201682 | 4.11 | 5.0 |
| Run 1\_Trace 1613475925267 | 3.99 | 3.0 |
| Run 1\_Trace 1613491440309 | 4.55 | 4.0 |
| Run 1\_Trace 1613485242647 | 4.99 | 4.0 |
| 1E5.3 | 4.31 | 5.0 |
| Run 1\_Trace 1613475820370 | 3.56 | 3.0 |
| Run 1\_Trace 1613590861620 | 4.33 | 5.0 |
| Run 1\_Trace 1613490625198 | 3.24 | 4.0 |
| Run 1\_Trace 1613475798962 | 2.83 | 2.0 |
| Run 1\_Trace 1613490164730 | 4.83 | 4.0 |
| Run 1\_Trace 1613480341293 | 3.18 | 4.0 |
| Run 1\_Trace 1613485175775 | 3.48 | 4.0 |
| Run 1\_Trace 1613475918739 | 2.01 | 3.0 |
| 2.57 | 1.0 | 2.0 |
| Run 1\_Trace 1613475771703 | 2.97 | 2.0 |
| Run 1\_Trace 1613484366333 | 4.53 | 4.0 |
| Run 1\_Trace 1613475978450 | 3.71 | 3.0 |
| Run 1\_Trace 1613609201391 | 4.16 | 5.0 |
| Run 1\_Trace 1613557630144 | 4.17 | 5.0 |
| Run 1\_Trace 1613485189310 | 4.64 | 4.0 |
| Run 1\_Trace 1613475899841 | 3.61 | 3.0 |
| Run 1\_Trace 1613476260849 | 3.15 | 4.0 |
| Run 1\_Trace 1613476013920 | 2.03 | 3.0 |
| Run 1\_Trace 1613489169588 | 3.02 | 4.0 |
| Run 1\_Trace 1613477450752 | 4.7 | 4.0 |
| 2.70 | 2.71 | 2.0 |
| Run 1\_Trace 1613566082521 | 4.32 | 5.0 |
| Run 1\_Trace 1613475861877 | 2.46 | 3.0 |
| Run 1\_Trace 1613489572912 | 4.59 | 4.0 |
| Run 1\_Trace 1613476009759 | 3.82 | 3.0 |
| Run 1\_Trace 1613478369301 | 4.65 | 4.0 |
| Run 1\_Trace 1613485938022 | 4.63 | 4.0 |
| Run 1\_Trace 1613570723184 | 4.47 | 5.0 |
| Run 1\_Trace 1613590956663 | 4.47 | 5.0 |
| Run 1\_Trace 1613490759093 | 4.56 | 4.0 |
| Run 1\_Trace 1613476005162 | 2.04 | 3.0 |
| Run 1\_Trace 1613487252472 | 4.52 | 4.0 |
| Run 1\_Trace 1613489562765 | 4.61 | 4.0 |
| Run 1\_Trace 1613475791219 | 2.56 | 2.0 |
| Run 1\_Trace 1613657502083 | 3.98 | 5.0 |
| Run 1\_Trace 1613478433404 | 4.62 | 4.0 |
| Run 1\_Trace 1613683346774 | 4.47 | 5.0 |
| Run 1\_Trace 1613644232654 | 4.11 | 5.0 |
| Run 1\_Trace 1613475894905 | 3.57 | 3.0 |
| Run 1\_Trace 1613559906202 | 4.21 | 5.0 |
| Run 1\_Trace 1613647735471 | 4.41 | 5.0 |
| Run 1\_Trace 1613475998085 | 2.49 | 3.0 |
| Run 1\_Trace 1613485520147 | 4.52 | 4.0 |
| Run 1\_Trace 1613566868257 | 4.16 | 5.0 |
| Run 1\_Trace 1613662440869 | 4.2 | 5.0 |
| Run 1\_Trace 1613684158856 | 4.24 | 5.0 |
| Run 1\_Trace 1613565310400 | 3.84 | 5.0 |
| Run 1\_Trace 1613488499204 | 3.4 | 4.0 |
| Run 1\_Trace 1613475772792 | 1.1 | 2.0 |
| Run 1\_Trace 1613475762564 | 2.58 | 2.0 |
| Run 1\_Trace 1613475776153 | 2.82 | 2.0 |
| 5.22 | 4.96 | 4.0 |
| Run 1\_Trace 1613475964323 | 2.5 | 3.0 |
| Run 1\_Trace 1613477755383 | 3.33 | 4.0 |
| Run 1\_Trace 1613683100486 | 4.36 | 5.0 |
| Run 1\_Trace 1613483569986 | 3.49 | 4.0 |
| Run 1\_Trace 1613642019497 | 4.48 | 5.0 |
| 5.66 | 4.66 | 4.0 |
| Run 1\_Trace 1613476012276 | 2.44 | 3.0 |
| Run 1\_Trace 1613475823658 | 3.52 | 3.0 |
| Run 1\_Trace 1613669815983 | 4.18 | 5.0 |
| 5.37 | 4.66 | 4.0 |
| Run 1\_Trace 1613660851108 | 4.31 | 5.0 |
| Run 1\_Trace 1613635535439 | 4.32 | 5.0 |
| Run 1\_Trace 1613480605289 | 4.53 | 4.0 |
| Run 1\_Trace 1613558687361 | 4.23 | 5.0 |
| Run 1\_Trace 1613478016657 | 3.04 | 4.0 |
| 5.13 | 4.2 | 5.0 |
| 5.51 | 4.13 | 5.0 |
| Run 1\_Trace 1613475893936 | 2.17 | 3.0 |
| Run 1\_Trace 1613600436392 | 4.1 | 5.0 |
| Run 1\_Trace 1613580096540 | 4.33 | 5.0 |
| 5.73 | 4.26 | 5.0 |
| Run 1\_Trace 1613634201127 | 4.33 | 5.0 |
| Run 1\_Trace 1613491134516 | 3.16 | 4.0 |
| Run 1\_Trace 1613478394698 | 4.85 | 4.0 |
| Run 1\_Trace 1613475887187 | 3.51 | 3.0 |
| Run 1\_Trace 1613657164536 | 4.48 | 5.0 |
| Run 1\_Trace 1613482590318 | 3.13 | 4.0 |
| Run 1\_Trace 1613488910148 | 4.86 | 4.0 |
| Run 1\_Trace 1613475764287 | 2.72 | 2.0 |
| Run 1\_Trace 1613588758722 | 4.1 | 5.0 |
| Run 1\_Trace 1613475881564 | 3.51 | 3.0 |
| 3.46D | 2.13 | 3.0 |
| Run 1\_Trace 1613475783697 | 2.65 | 2.0 |
| Run 1\_Trace 1613475823047 | 4.13 | 3.0 |
| Run 1\_Trace 1613590269534 | 4.48 | 5.0 |
| Run 1\_Trace 1613690829890 | 4.03 | 5.0 |
| Run 1\_Trace 1613487555521 | 3.02 | 4.0 |
| Run 1\_Trace 1613475796537 | 2.62 | 2.0 |
| Run 1\_Trace 1613490872711 | 3.43 | 4.0 |
| Run 1\_Trace 1613475770744 | 1.07 | 2.0 |
| Run 1\_Trace 1613489852015 | 4.9 | 4.0 |
| Run 1\_Trace 1613475780064 | 2.54 | 2.0 |
| Run 1\_Trace 1613476008652 | 3.83 | 3.0 |
| Run 1\_Trace 1613492009766 | 3.28 | 4.0 |
| 40-1\_G01\_19 | 1.08 | 2.0 |
| Run 1\_Trace 1613475943344 | 2.31 | 3.0 |
| 4.10 | 4.64 | 4.0 |
| Run 1\_Trace 1613475932532 | 2.35 | 3.0 |
| Run 1\_Trace 1613482920474 | 4.92 | 4.0 |
| Run 1\_Trace 1613652256892 | 3.88 | 5.0 |
| Run 1\_Trace 1613475992589 | 3.51 | 3.0 |
| Run 1\_Trace 1613652566084 | 4.16 | 5.0 |
| Run 1\_Trace 1613640321656 | 4.06 | 5.0 |
| Run 1\_Trace 1613489156441 | 3.06 | 4.0 |
| Run 1\_Trace 1613612287314 | 4.44 | 5.0 |
| 5.61 | 4.59 | 4.0 |
| Run 1\_Trace 1613488566402 | 3.4 | 4.0 |
| Run 1\_Trace 1613475999911 | 4.03 | 3.0 |
| Run 1\_Trace 1613475814712 | 4.05 | 3.0 |

RFC19\_merged

Misclassifications on training data:

|  |  |  |
| --- | --- | --- |
| **Profile** | **Prediction** | **Actual** |
| Run 1\_Trace 1613656896388 | 4.0 | 5.0 |
| Run 1\_Trace 1613475831775 | 2.0 | 3.0 |
| 3.23D | 2.0 | 3.0 |
| Run 1\_Trace 1613475966337 | 2.0 | 3.0 |
| Run 1\_Trace 1613483325839 | 3.0 | 4.0 |
| Run 1\_Trace 1613602431247 | 3.0 | 5.0 |
| Run 1\_Trace 1613478685312 | 5.0 | 4.0 |
| Run 1\_Trace 1613645193192 | 4.0 | 5.0 |
| Run 1\_Trace 1613475929748 | 2.0 | 3.0 |
| Run 1\_Trace 1613488215176 | 5.0 | 4.0 |
| Run 1\_Trace 1613479805153 | 3.0 | 4.0 |
| Run 1\_Trace 1613475960921 | 4.0 | 3.0 |
| Run 1\_Trace 1613479276233 | 5.0 | 4.0 |
| Run 1\_Trace 1613479182710 | 3.0 | 4.0 |
| Run 1\_Trace 1613490944678 | 3.0 | 4.0 |
| Run 1\_Trace 1613621178332 | 4.0 | 5.0 |
| Run 1\_Trace 1613475912589 | 2.0 | 3.0 |
| 4.19 | 5.0 | 4.0 |
| Run 1\_Trace 1613488294231 | 5.0 | 4.0 |
| Run 1\_Trace 1613678253953 | 4.0 | 5.0 |
| Run 1\_Trace 1613584411851 | 4.0 | 5.0 |
| Run 1\_Trace 1613475913045 | 2.0 | 3.0 |
| Run 1\_Trace 1613475982507 | 2.0 | 3.0 |
| Run 1\_Trace 1613676204027 | 4.0 | 5.0 |
| Run 1\_Trace 1613475960348 | 2.0 | 3.0 |
| Run 1\_Trace 1613476009677 | 2.0 | 3.0 |
| 5E3.3 | 2.0 | 3.0 |
| Run 1\_Trace 1613633434109 | 3.0 | 5.0 |
| Run 1\_Trace 1613478838259 | 5.0 | 4.0 |
| Run 1\_Trace 1613484244657 | 3.0 | 4.0 |
| Run 1\_Trace 1613475813311 | 4.0 | 3.0 |
| 5.64 | 5.0 | 4.0 |
| Run 1\_Trace 1613475778023 | 1.0 | 2.0 |
| Run 1\_Trace 1613475904457 | 2.0 | 3.0 |
| 5.14 | 4.0 | 5.0 |
| 4.64 | 3.0 | 4.0 |
| Run 1\_Trace 1613475998564 | 2.0 | 3.0 |
| Run 1\_Trace 1613483209776 | 3.0 | 4.0 |
| Run 1\_Trace 1613476588012 | 3.0 | 4.0 |
| 3.31D | 2.0 | 3.0 |
| Run 1\_Trace 1613475789527 | 1.0 | 2.0 |
| Run 1\_Trace 1613475968149 | 2.0 | 3.0 |
| Run 1\_Trace 1613475825772 | 4.0 | 3.0 |
| Run 1\_Trace 1613475945002 | 2.0 | 3.0 |
| Run 1\_Trace 1613490031846 | 3.0 | 4.0 |
| Run 1\_Trace 1613475799551 | 1.0 | 2.0 |
| Run 1\_Trace 1613475994848 | 2.0 | 3.0 |
| Run 1\_Trace 1613476524461 | 3.0 | 4.0 |
| 6E3.3 | 4.0 | 3.0 |
| Run 1\_Trace 1613485626967 | 3.0 | 4.0 |
| Run 1\_Trace 1613476016033 | 2.0 | 3.0 |
| Run 1\_Trace 1613492065527 | 5.0 | 4.0 |
| Run 1\_Trace 1613669483368 | 4.0 | 5.0 |
| Run 1\_Trace 1613585473784 | 4.0 | 5.0 |
| Run 1\_Trace 1613609796912 | 4.0 | 5.0 |
| 4.71 | 3.0 | 4.0 |
| Run 1\_Trace 1613475953557 | 2.0 | 3.0 |
| Run 1\_Trace 1613671126356 | 4.0 | 5.0 |
| Run 1\_Trace 1613476562448 | 3.0 | 4.0 |
| Run 1\_Trace 1613490039412 | 3.0 | 4.0 |
| Run 1\_Trace 1613487732246 | 5.0 | 4.0 |
| Run 1\_Trace 1613582835298 | 3.0 | 5.0 |
| Run 1\_Trace 1613478032917 | 5.0 | 4.0 |
| 5.41 | 5.0 | 4.0 |
| Run 1\_Trace 1613488901208 | 5.0 | 4.0 |
| Run 1\_Trace 1613562659547 | 4.0 | 5.0 |
| Run 1\_Trace 1613486194875 | 3.0 | 4.0 |
| Run 1\_Trace 1613618628303 | 4.0 | 5.0 |
| Run 1\_Trace 1613475799462 | 3.0 | 2.0 |
| Run 1\_Trace 1613487188670 | 3.0 | 4.0 |
| Run 1\_Trace 1613491070505 | 3.0 | 4.0 |
| Run 1\_Trace 1613635023805 | 4.0 | 5.0 |
| 4.18 | 5.0 | 4.0 |
| 4.58 | 3.0 | 4.0 |
| Run 1\_Trace 1613679227595 | 4.0 | 5.0 |
| Run 1\_Trace 1613485360196 | 5.0 | 4.0 |
| Run 1\_Trace 1613630665245 | 4.0 | 5.0 |
| 4.72 | 3.0 | 4.0 |
| Run 1\_Trace 1613492073869 | 3.0 | 4.0 |
| Run 1\_Trace 1613478660440 | 5.0 | 4.0 |
| 5.59 | 4.0 | 5.0 |
| Run 1\_Trace 1613475933935 | 2.0 | 3.0 |
| 4.15 | 3.0 | 4.0 |
| Run 1\_Trace 1613487753348 | 3.0 | 4.0 |
| Run 1\_Trace 1613488861725 | 5.0 | 4.0 |
| Run 1\_Trace 1613475824154 | 2.0 | 3.0 |
| Run 1\_Trace 1613490911103 | 3.0 | 4.0 |
| Run 1\_Trace 1613475880759 | 4.0 | 3.0 |
| Run 1\_Trace 1613674698090 | 4.0 | 5.0 |
| 4C4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613481568829 | 5.0 | 4.0 |
| Run 1\_Trace 1613669973669 | 4.0 | 5.0 |
| Run 1\_Trace 1613475805185 | 2.0 | 3.0 |
| Run 1\_Trace 1613475856276 | 2.0 | 3.0 |
| Run 1\_Trace 1613477321153 | 5.0 | 4.0 |
| Run 1\_Trace 1613578035801 | 4.0 | 5.0 |
| Run 1\_Trace 1613637725147 | 4.0 | 5.0 |
| 4.44 | 3.0 | 4.0 |
| Run 1\_Trace 1613477408780 | 3.0 | 4.0 |
| 1A5.3 | 4.0 | 5.0 |
| Run 1\_Trace 1613476005740 | 4.0 | 3.0 |
| 2.01 | 1.0 | 2.0 |
| Run 1\_Trace 1613481268094 | 5.0 | 4.0 |
| 4.05 | 5.0 | 4.0 |
| 4.02 | 5.0 | 4.0 |
| Run 1\_Trace 1613664333993 | 4.0 | 5.0 |
| Run 1\_Trace 1613598214290 | 4.0 | 5.0 |
| Run 1\_Trace 1613484057467 | 5.0 | 4.0 |
| Run 1\_Trace 1613478642013 | 5.0 | 4.0 |
| Run 1\_Trace 1613475783082 | 1.0 | 2.0 |
| Run 1\_Trace 1613614209890 | 4.0 | 5.0 |
| Run 1\_Trace 1613475763038 | 1.0 | 2.0 |
| Run 1\_Trace 1613635802186 | 4.0 | 5.0 |
| 3.15D | 2.0 | 3.0 |
| 4A4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613652620533 | 4.0 | 5.0 |
| Run 1\_Trace 1613630731937 | 4.0 | 5.0 |
| 2D4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613482995728 | 3.0 | 4.0 |
| Run 1\_Trace 1613478417045 | 3.0 | 4.0 |
| Run 1\_Trace 1613479122580 | 3.0 | 4.0 |
| Run 1\_Trace 1613475966221 | 2.0 | 3.0 |
| Run 1\_Trace 1613489498550 | 5.0 | 4.0 |
| 3D2.3 | 3.0 | 2.0 |
| Run 1\_Trace 1613484230582 | 5.0 | 4.0 |
| Run 1\_Trace 1613476013631 | 4.0 | 3.0 |
| Run 1\_Trace 1613475942044 | 2.0 | 3.0 |
| Run 1\_Trace 1613487291341 | 3.0 | 4.0 |
| Run 1\_Trace 1613628848371 | 4.0 | 5.0 |
| Run 1\_Trace 1613475966414 | 2.0 | 3.0 |
| 3.58 | 4.0 | 3.0 |
| Run 1\_Trace 1613478555400 | 3.0 | 4.0 |
| Run 1\_Trace 1613479767902 | 3.0 | 4.0 |
| Run 1\_Trace 1613486489986 | 5.0 | 4.0 |
| Run 1\_Trace 1613484609922 | 3.0 | 4.0 |
| Run 1\_Trace 1613475767291 | 3.0 | 2.0 |
| Run 1\_Trace 1613475913219 | 2.0 | 3.0 |
| Run 1\_Trace 1613481659281 | 3.0 | 4.0 |
| Run 1\_Trace 1613475843278 | 4.0 | 3.0 |
| Run 1\_Trace 1613484704669 | 5.0 | 4.0 |
| Run 1\_Trace 1613478568026 | 3.0 | 4.0 |
| Run 1\_Trace 1613485573476 | 3.0 | 4.0 |
| Run 1\_Trace 1613634538105 | 4.0 | 5.0 |
| Run 1\_Trace 1613476002296 | 2.0 | 3.0 |
| 1D5.3\_rerun | 4.0 | 5.0 |
| Run 1\_Trace 1613603423666 | 4.0 | 5.0 |
| Run 1\_Trace 1613475936058 | 2.0 | 3.0 |
| Run 1\_Trace 1613475836212 | 4.0 | 3.0 |
| Run 1\_Trace 1613484199284 | 3.0 | 4.0 |
| 3.73 | 4.0 | 3.0 |
| 1C5.3 | 4.0 | 5.0 |
| Run 1\_Trace 1613475966720 | 2.0 | 3.0 |
| Run 1\_Trace 1613475933493 | 2.0 | 3.0 |
| Run 1\_Trace 1613486612058 | 3.0 | 4.0 |
| Run 1\_Trace 1613475910924 | 2.0 | 3.0 |
| 4.12 | 5.0 | 4.0 |
| Run 1\_Trace 1613475932992 | 1.0 | 3.0 |
| Run 1\_Trace 1613681625744 | 4.0 | 5.0 |
| Run 1\_Trace 1613490476714 | 3.0 | 4.0 |
| Run 1\_Trace 1613475841982 | 4.0 | 3.0 |
| 4.26 | 3.0 | 4.0 |
| 3A5.3 | 3.0 | 5.0 |
| 3.43 | 4.0 | 3.0 |
| Run 1\_Trace 1613489238377 | 3.0 | 4.0 |
| Run 1\_Trace 1613675435199 | 4.0 | 5.0 |
| Run 1\_Trace 1613475915244 | 2.0 | 3.0 |
| Run 1\_Trace 1613628841674 | 4.0 | 5.0 |
| Run 1\_Trace 1613487227621 | 3.0 | 4.0 |
| Run 1\_Trace 1613488460648 | 5.0 | 4.0 |
| Run 1\_Trace 1613612276693 | 4.0 | 5.0 |
| 5.27 | 4.0 | 5.0 |
| Run 1\_Trace 1613475944246 | 2.0 | 3.0 |
| Run 1\_Trace 1613558962827 | 4.0 | 5.0 |
| Run 1\_Trace 1613481015632 | 5.0 | 4.0 |
| Run 1\_Trace 1613475983696 | 2.0 | 3.0 |
| Run 1\_Trace 1613481992706 | 3.0 | 4.0 |
| 4.14 | 5.0 | 4.0 |
| Run 1\_Trace 1613476957757 | 5.0 | 4.0 |
| Run 1\_Trace 1613478894922 | 5.0 | 4.0 |
| Run 1\_Trace 1613485309862 | 3.0 | 4.0 |
| Run 1\_Trace 1613475973427 | 2.0 | 3.0 |
| Run 1\_Trace 1613475963137 | 4.0 | 3.0 |
| Run 1\_Trace 1613479019696 | 5.0 | 4.0 |
| Run 1\_Trace 1613475882115 | 4.0 | 3.0 |
| Run 1\_Trace 1613483022986 | 3.0 | 4.0 |
| Run 1\_Trace 1613480229809 | 5.0 | 4.0 |
| 6C4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613482223235 | 3.0 | 4.0 |
| Run 1\_Trace 1613491910343 | 5.0 | 4.0 |
| Run 1\_Trace 1613479213398 | 5.0 | 4.0 |
| Run 1\_Trace 1613475933414 | 2.0 | 3.0 |
| Run 1\_Trace 1613595368814 | 4.0 | 5.0 |
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| Run 1\_Trace 1613480947095 | 5.0 | 4.0 |
| Run 1\_Trace 1613478094522 | 3.0 | 4.0 |
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| Run 1\_Trace 1613475883010 | 2.0 | 3.0 |
| Run 1\_Trace 1613569341873 | 3.0 | 5.0 |
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| Run 1\_Trace 1613487608113 | 3.0 | 4.0 |
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| Run 1\_Trace 1613475808761 | 4.0 | 3.0 |
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| Run 1\_Trace 1613619273736 | 4.0 | 5.0 |
| 1E4.3 | 3.0 | 4.0 |
| Run 1\_Trace 1613665671832 | 4.0 | 5.0 |
| Run 1\_Trace 1613475988581 | 2.0 | 3.0 |
| Run 1\_Trace 1613475821068 | 2.0 | 3.0 |
| Run 1\_Trace 1613490185135 | 3.0 | 4.0 |
| Run 1\_Trace 1613486808170 | 5.0 | 4.0 |
| Run 1\_Trace 1613482667437 | 5.0 | 4.0 |
| Run 1\_Trace 1613475844633 | 4.0 | 3.0 |
| Run 1\_Trace 1613484896215 | 3.0 | 4.0 |
| 4.68 | 2.0 | 3.0 |
| Run 1\_Trace 1613601586975 | 4.0 | 5.0 |
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| Run 1\_Trace 1613479142732 | 3.0 | 4.0 |
| Run 1\_Trace 1613475841039 | 2.0 | 3.0 |
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| Run 1\_Trace 1613484693570 | 3.0 | 4.0 |
| 3E5.3 | 4.0 | 5.0 |
| Run 1\_Trace 1613484491776 | 3.0 | 4.0 |
| Run 1\_Trace 1613475754546 | 1.0 | 2.0 |
| 5.18 | 4.0 | 5.0 |
| 3D4.3 | 5.0 | 4.0 |
| 5.30 | 5.0 | 4.0 |
| 5.48 | 4.0 | 5.0 |
| Run 1\_Trace 1613679525222 | 4.0 | 5.0 |
| 3.27 | 4.0 | 3.0 |
| Run 1\_Trace 1613475833918 | 4.0 | 3.0 |
| Run 1\_Trace 1613475810316 | 4.0 | 3.0 |
| Run 1\_Trace 1613481263220 | 3.0 | 4.0 |
| Run 1\_Trace 1613475884401 | 2.0 | 3.0 |
| 4.57 | 2.0 | 3.0 |
| Run 1\_Trace 1613477821556 | 3.0 | 4.0 |
| Run 1\_Trace 1613481484226 | 3.0 | 4.0 |
| Run 1\_Trace 1613477826067 | 5.0 | 4.0 |
| Run 1\_Trace 1613476015287 | 2.0 | 3.0 |
| Run 1\_Trace 1613475815595 | 4.0 | 3.0 |
| Run 1\_Trace 1613475896788 | 2.0 | 3.0 |
| Run 1\_Trace 1613642445029 | 4.0 | 5.0 |
| 3.76 | 4.0 | 3.0 |
| Run 1\_Trace 1613489611362 | 3.0 | 4.0 |
| Run 1\_Trace 1613476252820 | 3.0 | 4.0 |
| Run 1\_Trace 1613612688548 | 4.0 | 5.0 |
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| Run 1\_Trace 1613488730716 | 3.0 | 4.0 |
| Run 1\_Trace 1613477615673 | 3.0 | 4.0 |
| Run 1\_Trace 1613475974836 | 2.0 | 3.0 |
| 2.40 | 3.0 | 2.0 |
| Run 1\_Trace 1613486550707 | 3.0 | 4.0 |
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| Run 1\_Trace 1613475850179 | 4.0 | 3.0 |
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| Run 1\_Trace 1613476007916 | 2.0 | 3.0 |
| Run 1\_Trace 1613475938569 | 4.0 | 3.0 |
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| Run 1\_Trace 1613481791745 | 5.0 | 4.0 |
| Run 1\_Trace 1613616862294 | 4.0 | 5.0 |
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| 3.05 | 3.0 | 2.0 |
| Run 1\_Trace 1613478991941 | 3.0 | 4.0 |
| Run 1\_Trace 1613476005618 | 2.0 | 3.0 |
| 4.60 | 3.0 | 4.0 |
| Run 1\_Trace 1613480039132 | 5.0 | 4.0 |
| Run 1\_Trace 1613481955106 | 3.0 | 4.0 |
| Run 1\_Trace 1613475854189 | 2.0 | 3.0 |
| Run 1\_Trace 1613480171848 | 5.0 | 4.0 |
| Run 1\_Trace 1613475812784 | 2.0 | 3.0 |
| Run 1\_Trace 1613489020688 | 3.0 | 4.0 |
| 3.33 | 4.0 | 3.0 |
| Run 1\_Trace 1613475899187 | 2.0 | 3.0 |
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| Run 1\_Trace 1613630176090 | 4.0 | 5.0 |
| Run 1\_Trace 1613612631915 | 4.0 | 5.0 |
| 3.71 | 4.0 | 3.0 |
| Run 1\_Trace 1613627691940 | 4.0 | 5.0 |
| Run 1\_Trace 1613475994932 | 2.0 | 3.0 |
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| Run 1\_Trace 1613487233502 | 5.0 | 4.0 |
| Run 1\_Trace 1613650429413 | 4.0 | 5.0 |
| Run 1\_Trace 1613478739799 | 3.0 | 4.0 |
| Run 1\_Trace 1613478164201 | 5.0 | 4.0 |
| Run 1\_Trace 1613480016779 | 3.0 | 4.0 |
| Run 1\_Trace 1613481936466 | 3.0 | 4.0 |
| Run 1\_Trace 1613669663467 | 4.0 | 5.0 |
| 10-10\_A01\_01 | 3.0 | 2.0 |
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| Run 1\_Trace 1613491379997 | 5.0 | 4.0 |
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| Run 1\_Trace 1613479049727 | 5.0 | 4.0 |
| Run 1\_Trace 1613612108128 | 4.0 | 5.0 |
| Run 1\_Trace 1613483339488 | 5.0 | 4.0 |
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| Run 1\_Trace 1613480624436 | 3.0 | 4.0 |
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| Run 1\_Trace 1613664082651 | 4.0 | 5.0 |
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| Run 1\_Trace 1613491677933 | 3.0 | 4.0 |
| Run 1\_Trace 1613627291048 | 4.0 | 5.0 |
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| Run 1\_Trace 1613475768619 | 3.0 | 2.0 |
| Run 1\_Trace 1613475864102 | 2.0 | 3.0 |
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| Run 1\_Trace 1613655604371 | 4.0 | 5.0 |
| 3A4.3 | 3.0 | 4.0 |
| Run 1\_Trace 1613475832133 | 2.0 | 3.0 |
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| Run 1\_Trace 1613475984429 | 2.0 | 3.0 |
| Run 1\_Trace 1613475952130 | 4.0 | 3.0 |
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| Run 1\_Trace 1613680845564 | 4.0 | 5.0 |
| Run 1\_Trace 1613475804136 | 3.0 | 2.0 |
| Run 1\_Trace 1613650533400 | 4.0 | 5.0 |
| Run 1\_Trace 1613491647147 | 5.0 | 4.0 |
| Run 1\_Trace 1613475936749 | 4.0 | 3.0 |
| Run 1\_Trace 1613475877696 | 4.0 | 3.0 |
| Run 1\_Trace 1613475885952 | 2.0 | 3.0 |
| 2B4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613483622557 | 3.0 | 4.0 |
| Run 1\_Trace 1613475954595 | 4.0 | 3.0 |
| Run 1\_Trace 1613483315131 | 5.0 | 4.0 |
| Run 1\_Trace 1613639368453 | 4.0 | 5.0 |
| Run 1\_Trace 1613475832344 | 2.0 | 3.0 |
| Run 1\_Trace 1613488320423 | 3.0 | 4.0 |
| Run 1\_Trace 1613670981159 | 4.0 | 5.0 |
| Run 1\_Trace 1613480282342 | 3.0 | 4.0 |
| Run 1\_Trace 1613488823878 | 5.0 | 4.0 |
| Run 1\_Trace 1613558387553 | 4.0 | 5.0 |
| Run 1\_Trace 1613638892596 | 4.0 | 5.0 |
| Run 1\_Trace 1613475984151 | 4.0 | 3.0 |
| Run 1\_Trace 1613488808490 | 5.0 | 4.0 |
| 2.76 | 3.0 | 2.0 |
| Run 1\_Trace 1613478548027 | 3.0 | 4.0 |
| Run 1\_Trace 1613482729560 | 3.0 | 4.0 |
| Run 1\_Trace 1613475834696 | 2.0 | 3.0 |
| Run 1\_Trace 1613569014574 | 4.0 | 5.0 |
| Run 1\_Trace 1613482075908 | 3.0 | 4.0 |
| Run 1\_Trace 1613484925238 | 5.0 | 4.0 |
| Run 1\_Trace 1613661820646 | 4.0 | 5.0 |
| 3.22 | 4.0 | 3.0 |
| Run 1\_Trace 1613482766863 | 5.0 | 4.0 |
| Run 1\_Trace 1613475807479 | 4.0 | 3.0 |
| 1B4.3 | 3.0 | 4.0 |
| Run 1\_Trace 1613475917134 | 4.0 | 3.0 |
| 2D2.3 | 3.0 | 2.0 |
| Run 1\_Trace 1613624171917 | 4.0 | 5.0 |
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| Run 1\_Trace 1613570383301 | 4.0 | 5.0 |
| Run 1\_Trace 1613475902009 | 4.0 | 3.0 |
| Run 1\_Trace 1613485067646 | 5.0 | 4.0 |
| 5D2.3 | 3.0 | 2.0 |
| Run 1\_Trace 1613483783362 | 3.0 | 4.0 |
| Run 1\_Trace 1613477351392 | 3.0 | 4.0 |
| Run 1\_Trace 1613590104290 | 4.0 | 5.0 |
| Run 1\_Trace 1613481961119 | 5.0 | 4.0 |
| Run 1\_Trace 1613475914057 | 2.0 | 3.0 |
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| Run 1\_Trace 1613574494452 | 4.0 | 5.0 |
| 6A4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613488476162 | 5.0 | 4.0 |
| Run 1\_Trace 1613475942658 | 4.0 | 3.0 |
| Run 1\_Trace 1613491361764 | 5.0 | 4.0 |
| Run 1\_Trace 1613475833671 | 2.0 | 3.0 |
| 5B4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613476861936 | 5.0 | 4.0 |
| Run 1\_Trace 1613475960416 | 4.0 | 3.0 |
| Run 1\_Trace 1613608108191 | 4.0 | 5.0 |
| Run 1\_Trace 1613475953102 | 2.0 | 3.0 |
| Run 1\_Trace 1613475843612 | 4.0 | 3.0 |
| Run 1\_Trace 1613475999368 | 2.0 | 3.0 |
| Run 1\_Trace 1613490970982 | 3.0 | 4.0 |
| 3.10 | 4.0 | 3.0 |
| Run 1\_Trace 1613478354951 | 3.0 | 4.0 |
| 4.06 | 5.0 | 4.0 |
| Run 1\_Trace 1613475924812 | 4.0 | 3.0 |
| 5.78 | 4.0 | 5.0 |
| Run 1\_Trace 1613482501912 | 3.0 | 4.0 |
| Run 1\_Trace 1613489875156 | 5.0 | 4.0 |
| Run 1\_Trace 1613491313390 | 5.0 | 4.0 |
| Run 1\_Trace 1613476630914 | 3.0 | 4.0 |
| Run 1\_Trace 1613486860483 | 3.0 | 4.0 |
| Run 1\_Trace 1613483920040 | 5.0 | 4.0 |
| Run 1\_Trace 1613484781541 | 3.0 | 4.0 |
| Run 1\_Trace 1613486024060 | 3.0 | 4.0 |
| Run 1\_Trace 1613687625368 | 4.0 | 5.0 |
| 4.08 | 3.0 | 4.0 |
| Run 1\_Trace 1613485172553 | 3.0 | 4.0 |
| Run 1\_Trace 1613489893311 | 3.0 | 4.0 |
| Run 1\_Trace 1613486294781 | 3.0 | 4.0 |
| 5.15 | 4.0 | 5.0 |
| Run 1\_Trace 1613475979684 | 2.0 | 3.0 |
| Run 1\_Trace 1613476988636 | 3.0 | 4.0 |
| Run 1\_Trace 1613486280031 | 5.0 | 4.0 |
| Run 1\_Trace 1613487389113 | 3.0 | 4.0 |
| Run 1\_Trace 1613603359218 | 4.0 | 5.0 |
| 4.70 | 3.0 | 4.0 |
| 4.04 | 5.0 | 4.0 |
| Run 1\_Trace 1613475774126 | 3.0 | 2.0 |
| Run 1\_Trace 1613475875880 | 2.0 | 3.0 |
| Run 1\_Trace 1613664602313 | 4.0 | 5.0 |
| Run 1\_Trace 1613486277815 | 3.0 | 4.0 |
| Run 1\_Trace 1613489352253 | 5.0 | 4.0 |
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| Run 1\_Trace 1613483604531 | 3.0 | 4.0 |
| Run 1\_Trace 1613636038241 | 4.0 | 5.0 |
| Run 1\_Trace 1613475888416 | 4.0 | 3.0 |
| Run 1\_Trace 1613475996516 | 4.0 | 3.0 |
| 5C3.3 | 4.0 | 3.0 |
| Run 1\_Trace 1613490473381 | 3.0 | 4.0 |
| Run 1\_Trace 1613476004333 | 4.0 | 3.0 |
| Run 1\_Trace 1613652743215 | 4.0 | 5.0 |
| Run 1\_Trace 1613475956002 | 4.0 | 3.0 |
| 3.20D | 2.0 | 3.0 |
| Run 1\_Trace 1613611357648 | 4.0 | 5.0 |
| 6D3.3 | 4.0 | 3.0 |
| 3.18 | 4.0 | 3.0 |
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| Run 1\_Trace 1613488038401 | 2.0 | 4.0 |
| Run 1\_Trace 1613483728764 | 5.0 | 4.0 |
| Run 1\_Trace 1613490838108 | 5.0 | 4.0 |
| Run 1\_Trace 1613591278719 | 4.0 | 5.0 |
| 5A4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613480423321 | 3.0 | 4.0 |
| Run 1\_Trace 1613482515905 | 5.0 | 4.0 |
| Run 1\_Trace 1613478136403 | 3.0 | 4.0 |
| Run 1\_Trace 1613489403231 | 3.0 | 4.0 |
| Run 1\_Trace 1613477225670 | 3.0 | 4.0 |
| Run 1\_Trace 1613475973601 | 4.0 | 3.0 |
| Run 1\_Trace 1613490532931 | 5.0 | 4.0 |
| Run 1\_Trace 1613653201487 | 3.0 | 5.0 |
| 4.40 | 5.0 | 4.0 |
| Run 1\_Trace 1613475862892 | 4.0 | 3.0 |
| Run 1\_Trace 1613475944332 | 4.0 | 3.0 |
| Run 1\_Trace 1613475816854 | 4.0 | 3.0 |
| Run 1\_Trace 1613475901054 | 4.0 | 3.0 |
| Run 1\_Trace 1613477769393 | 3.0 | 4.0 |
| 2A4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613590904973 | 4.0 | 5.0 |
| Run 1\_Trace 1613478108543 | 3.0 | 4.0 |
| 5.33 | 4.0 | 5.0 |
| Run 1\_Trace 1613614116320 | 4.0 | 5.0 |
| Run 1\_Trace 1613671297546 | 4.0 | 5.0 |
| Run 1\_Trace 1613479859518 | 3.0 | 4.0 |
| Run 1\_Trace 1613487602310 | 3.0 | 4.0 |
| Run 1\_Trace 1613628556088 | 4.0 | 5.0 |
| 6D4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613475808691 | 2.0 | 3.0 |
| Run 1\_Trace 1613475996307 | 4.0 | 3.0 |
| Run 1\_Trace 1613485819076 | 5.0 | 4.0 |
| Run 1\_Trace 1613475970142 | 2.0 | 3.0 |
| Run 1\_Trace 1613478887595 | 3.0 | 4.0 |
| Run 1\_Trace 1613487098049 | 3.0 | 4.0 |
| Run 1\_Trace 1613484156214 | 5.0 | 4.0 |
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| Run 1\_Trace 1613648426032 | 4.0 | 5.0 |
| Run 1\_Trace 1613614531692 | 4.0 | 5.0 |
| Run 1\_Trace 1613475829502 | 4.0 | 3.0 |
| Run 1\_Trace 1613486720907 | 5.0 | 4.0 |
| Run 1\_Trace 1613481722294 | 5.0 | 4.0 |
| Run 1\_Trace 1613585270310 | 4.0 | 5.0 |
| 1B5.3 | 4.0 | 5.0 |
| 5C4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613577355103 | 4.0 | 5.0 |
| Run 1\_Trace 1613475763781 | 3.0 | 2.0 |
| Run 1\_Trace 1613490575918 | 5.0 | 4.0 |
| Run 1\_Trace 1613475912383 | 2.0 | 3.0 |
| Run 1\_Trace 1613598328713 | 4.0 | 5.0 |
| 5.09 | 5.0 | 4.0 |
| Run 1\_Trace 1613489308516 | 5.0 | 4.0 |
| Run 1\_Trace 1613481549883 | 5.0 | 4.0 |
| Run 1\_Trace 1613476354624 | 5.0 | 4.0 |
| Run 1\_Trace 1613484577633 | 3.0 | 4.0 |
| 5.21 | 5.0 | 4.0 |
| Run 1\_Trace 1613586359060 | 4.0 | 5.0 |
| Run 1\_Trace 1613675086229 | 4.0 | 5.0 |
| Run 1\_Trace 1613475951124 | 2.0 | 3.0 |
| Run 1\_Trace 1613623416979 | 4.0 | 5.0 |
| Run 1\_Trace 1613567343715 | 4.0 | 5.0 |
| Run 1\_Trace 1613485459149 | 3.0 | 4.0 |
| Run 1\_Trace 1613483275794 | 5.0 | 4.0 |
| 4D4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613475995647 | 2.0 | 3.0 |
| Run 1\_Trace 1613486560459 | 3.0 | 4.0 |
| Run 1\_Trace 1613616576152 | 4.0 | 5.0 |
| Run 1\_Trace 1613482971319 | 5.0 | 4.0 |
| Run 1\_Trace 1613491053828 | 3.0 | 4.0 |
| Run 1\_Trace 1613475882753 | 2.0 | 3.0 |
| Run 1\_Trace 1613475862624 | 2.0 | 3.0 |
| Run 1\_Trace 1613488655780 | 3.0 | 4.0 |
| 3.62 | 4.0 | 3.0 |
| Run 1\_Trace 1613475934397 | 2.0 | 3.0 |
| Run 1\_Trace 1613665983763 | 4.0 | 5.0 |
| Run 1\_Trace 1613475970406 | 4.0 | 3.0 |
| Run 1\_Trace 1613653481894 | 4.0 | 5.0 |
| Run 1\_Trace 1613475854568 | 4.0 | 3.0 |
| Run 1\_Trace 1613683763351 | 4.0 | 5.0 |
| Run 1\_Trace 1613667533945 | 4.0 | 5.0 |
| Run 1\_Trace 1613491779091 | 5.0 | 4.0 |
| Run 1\_Trace 1613475982996 | 2.0 | 3.0 |
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| Run 1\_Trace 1613475795804 | 3.0 | 2.0 |
| Run 1\_Trace 1613482368615 | 3.0 | 4.0 |
| Run 1\_Trace 1613475984820 | 2.0 | 3.0 |
| Run 1\_Trace 1613475894250 | 2.0 | 3.0 |
| Run 1\_Trace 1613488890939 | 5.0 | 4.0 |
| 5.24 | 5.0 | 4.0 |
| Run 1\_Trace 1613475875263 | 2.0 | 3.0 |
| Run 1\_Trace 1613479099603 | 3.0 | 4.0 |
| Run 1\_Trace 1613484556529 | 5.0 | 4.0 |
| Run 1\_Trace 1613491099491 | 5.0 | 4.0 |
| Run 1\_Trace 1613480626583 | 5.0 | 4.0 |
| Run 1\_Trace 1613481471139 | 3.0 | 4.0 |
| 3.34D | 1.0 | 3.0 |
| 2.44 | 1.0 | 2.0 |
| Run 1\_Trace 1613486036773 | 5.0 | 4.0 |
| 2C4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613481805019 | 5.0 | 4.0 |
| Run 1\_Trace 1613634059115 | 4.0 | 5.0 |
| Run 1\_Trace 1613604057292 | 4.0 | 5.0 |
| 4.67 | 3.0 | 4.0 |
| Run 1\_Trace 1613475916113 | 4.0 | 3.0 |
| 2.59 | 3.0 | 2.0 |
| Run 1\_Trace 1613486168131 | 5.0 | 4.0 |
| Run 1\_Trace 1613488536172 | 5.0 | 4.0 |
| Run 1\_Trace 1613478284730 | 3.0 | 4.0 |
| 2.17 | 1.0 | 2.0 |
| Run 1\_Trace 1613477662900 | 3.0 | 4.0 |
| Run 1\_Trace 1613475906299 | 4.0 | 3.0 |
| Run 1\_Trace 1613490991379 | 3.0 | 4.0 |
| Run 1\_Trace 1613480288562 | 3.0 | 4.0 |
| Run 1\_Trace 1613487036589 | 5.0 | 4.0 |
| 5.44 | 5.0 | 4.0 |
| Run 1\_Trace 1613634894448 | 4.0 | 5.0 |
| Run 1\_Trace 1613486640924 | 5.0 | 4.0 |
| Run 1\_Trace 1613475779685 | 1.0 | 2.0 |
| Run 1\_Trace 1613483814814 | 5.0 | 4.0 |
| 5.42 | 4.0 | 5.0 |
| Run 1\_Trace 1613475985475 | 2.0 | 3.0 |
| Run 1\_Trace 1613477861798 | 3.0 | 4.0 |
| Run 1\_Trace 1613599318083 | 4.0 | 5.0 |
| Run 1\_Trace 1613575988373 | 4.0 | 5.0 |
| Run 1\_Trace 1613489364803 | 5.0 | 4.0 |
| Run 1\_Trace 1613475992247 | 4.0 | 3.0 |
| Run 1\_Trace 1613475775473 | 3.0 | 2.0 |
| Run 1\_Trace 1613585783837 | 4.0 | 5.0 |
| Run 1\_Trace 1613583549908 | 4.0 | 5.0 |
| Run 1\_Trace 1613475920980 | 2.0 | 3.0 |
| Run 1\_Trace 1613475898953 | 4.0 | 3.0 |
| Run 1\_Trace 1613484298346 | 5.0 | 4.0 |
| Run 1\_Trace 1613490376316 | 3.0 | 4.0 |
| Run 1\_Trace 1613486870237 | 3.0 | 4.0 |
| 4E5.3 | 4.0 | 5.0 |
| Run 1\_Trace 1613475760769 | 3.0 | 2.0 |
| Run 1\_Trace 1613486351047 | 3.0 | 4.0 |
| 5.49 | 5.0 | 4.0 |
| Run 1\_Trace 1613673865196 | 4.0 | 5.0 |
| Run 1\_Trace 1613476713565 | 5.0 | 4.0 |
| Run 1\_Trace 1613659493075 | 4.0 | 5.0 |
| 5D4.3 | 5.0 | 4.0 |
| Run 1\_Trace 1613489117150 | 5.0 | 4.0 |
| Run 1\_Trace 1613487281478 | 3.0 | 4.0 |
| Run 1\_Trace 1613479505337 | 3.0 | 4.0 |
| Run 1\_Trace 1613475849794 | 4.0 | 3.0 |
| Run 1\_Trace 1613486771714 | 3.0 | 4.0 |
| Run 1\_Trace 1613475960714 | 2.0 | 3.0 |
| 4.33 | 3.0 | 4.0 |
| 5.07 | 5.0 | 4.0 |
| Run 1\_Trace 1613479244871 | 5.0 | 4.0 |
| Run 1\_Trace 1613475822900 | 2.0 | 3.0 |
| Run 1\_Trace 1613479606122 | 3.0 | 4.0 |
| Run 1\_Trace 1613489790722 | 3.0 | 4.0 |
| Run 1\_Trace 1613487764688 | 5.0 | 4.0 |
| Run 1\_Trace 1613481118633 | 3.0 | 4.0 |
| Run 1\_Trace 1613624230244 | 4.0 | 5.0 |
| Run 1\_Trace 1613487689278 | 3.0 | 4.0 |
| Run 1\_Trace 1613475976015 | 2.0 | 3.0 |
| Run 1\_Trace 1613669010719 | 4.0 | 5.0 |
| Run 1\_Trace 1613485421493 | 5.0 | 4.0 |
| 5.72 | 5.0 | 4.0 |
| Run 1\_Trace 1613475856028 | 2.0 | 3.0 |
| Run 1\_Trace 1613475988221 | 4.0 | 3.0 |
| Run 1\_Trace 1613490077685 | 5.0 | 4.0 |
| Run 1\_Trace 1613479434534 | 3.0 | 4.0 |
| Run 1\_Trace 1613651158975 | 4.0 | 5.0 |
| Run 1\_Trace 1613485271822 | 5.0 | 4.0 |
| Run 1\_Trace 1613490347427 | 5.0 | 4.0 |
| Run 1\_Trace 1613475952947 | 2.0 | 3.0 |
| Run 1\_Trace 1613476008587 | 2.0 | 3.0 |
| Run 1\_Trace 1613477837593 | 5.0 | 4.0 |
| 2.46 | 1.0 | 2.0 |
| Run 1\_Trace 1613477790164 | 5.0 | 4.0 |
| Run 1\_Trace 1613478817678 | 3.0 | 4.0 |
| Run 1\_Trace 1613570453572 | 4.0 | 5.0 |
| Run 1\_Trace 1613562081694 | 4.0 | 5.0 |
| Run 1\_Trace 1613475858770 | 2.0 | 3.0 |
| 3.77 | 4.0 | 3.0 |
| Run 1\_Trace 1613578115177 | 4.0 | 5.0 |
| 3.22D | 2.0 | 3.0 |
| Run 1\_Trace 1613486695150 | 5.0 | 4.0 |
| Run 1\_Trace 1613480347556 | 3.0 | 4.0 |
| Run 1\_Trace 1613485652141 | 5.0 | 4.0 |
| Run 1\_Trace 1613475986957 | 2.0 | 3.0 |
| Run 1\_Trace 1613475803155 | 3.0 | 2.0 |
| Run 1\_Trace 1613685919250 | 4.0 | 5.0 |
| Run 1\_Trace 1613487415531 | 3.0 | 4.0 |
| 5.35 | 4.0 | 5.0 |
| Run 1\_Trace 1613487944976 | 5.0 | 4.0 |
| Run 1\_Trace 1613489298032 | 5.0 | 4.0 |
| Run 1\_Trace 1613487112272 | 5.0 | 4.0 |
| Run 1\_Trace 1613482789048 | 5.0 | 4.0 |
| Run 1\_Trace 1613487429016 | 5.0 | 4.0 |
| Run 1\_Trace 1613595417793 | 4.0 | 5.0 |
| Run 1\_Trace 1613492038724 | 3.0 | 4.0 |
| Run 1\_Trace 1613475866342 | 2.0 | 3.0 |
| Run 1\_Trace 1613678030459 | 4.0 | 5.0 |
| Run 1\_Trace 1613475787575 | 1.0 | 2.0 |
| Run 1\_Trace 1613586524002 | 4.0 | 5.0 |
| 4.78 | 2.0 | 3.0 |
| Run 1\_Trace 1613475751811 | 3.0 | 2.0 |
| Run 1\_Trace 1613480097604 | 3.0 | 4.0 |
| Run 1\_Trace 1613476007207 | 4.0 | 3.0 |
| Run 1\_Trace 1613596601442 | 4.0 | 5.0 |
| Run 1\_Trace 1613663453291 | 4.0 | 5.0 |
| Run 1\_Trace 1613491922051 | 5.0 | 4.0 |
| Run 1\_Trace 1613615215864 | 4.0 | 5.0 |

Misclassifications on test data:

|  |  |  |
| --- | --- | --- |
| Run 1\_Trace 1613477972750 | 3.0 | 4.0 |
| 3.09 | 4.0 | 3.0 |
| Run 1\_Trace 1613486306353 | 5.0 | 4.0 |
| Run 1\_Trace 1613690434008 | 4.0 | 5.0 |
| Run 1\_Trace 1613640261912 | 4.0 | 5.0 |
| Run 1\_Trace 1613475838000 | 2.0 | 3.0 |
| Run 1\_Trace 1613490921772 | 5.0 | 4.0 |
| 3D5.3 | 4.0 | 5.0 |
| Run 1\_Trace 1613569840299 | 4.0 | 5.0 |
| Run 1\_Trace 1613478292234 | 5.0 | 4.0 |
| Run 1\_Trace 1613596150529 | 4.0 | 5.0 |
| Run 1\_Trace 1613485033615 | 3.0 | 4.0 |
| Run 1\_Trace 1613475848783 | 2.0 | 3.0 |
| Run 1\_Trace 1613650230121 | 4.0 | 5.0 |
| Run 1\_Trace 1613486593772 | 5.0 | 4.0 |
| 3.66 | 2.0 | 3.0 |
| Run 1\_Trace 1613478755556 | 3.0 | 4.0 |
| Run 1\_Trace 1613564387194 | 4.0 | 5.0 |
| 4.11 | 5.0 | 4.0 |
| Run 1\_Trace 1613478183114 | 3.0 | 4.0 |
| Run 1\_Trace 1613487537066 | 5.0 | 4.0 |
| Run 1\_Trace 1613475964168 | 2.0 | 3.0 |
| 4E3.3 | 2.0 | 3.0 |
| Run 1\_Trace 1613480966641 | 5.0 | 4.0 |
| Run 1\_Trace 1613475868422 | 4.0 | 3.0 |
| Run 1\_Trace 1613480671880 | 3.0 | 4.0 |
| Run 1\_Trace 1613611201682 | 4.0 | 5.0 |
| Run 1\_Trace 1613475925267 | 4.0 | 3.0 |
| Run 1\_Trace 1613480373102 | 3.0 | 4.0 |
| Run 1\_Trace 1613485242647 | 5.0 | 4.0 |
| 1E5.3 | 4.0 | 5.0 |
| 5.16 | 5.0 | 4.0 |
| Run 1\_Trace 1613475866662 | 2.0 | 3.0 |
| Run 1\_Trace 1613590861620 | 4.0 | 5.0 |
| Run 1\_Trace 1613490625198 | 3.0 | 4.0 |
| Run 1\_Trace 1613480068950 | 5.0 | 4.0 |
| Run 1\_Trace 1613475798962 | 3.0 | 2.0 |
| Run 1\_Trace 1613490164730 | 5.0 | 4.0 |
| Run 1\_Trace 1613480341293 | 3.0 | 4.0 |
| Run 1\_Trace 1613485175775 | 3.0 | 4.0 |
| Run 1\_Trace 1613475918739 | 2.0 | 3.0 |
| 2.57 | 1.0 | 2.0 |
| Run 1\_Trace 1613480523807 | 3.0 | 4.0 |
| Run 1\_Trace 1613475771703 | 3.0 | 2.0 |
| Run 1\_Trace 1613484366333 | 5.0 | 4.0 |
| Run 1\_Trace 1613609201391 | 4.0 | 5.0 |
| Run 1\_Trace 1613557630144 | 4.0 | 5.0 |
| Run 1\_Trace 1613592427698 | 4.0 | 5.0 |
| Run 1\_Trace 1613492093415 | 3.0 | 4.0 |
| Run 1\_Trace 1613475901264 | 4.0 | 3.0 |
| Run 1\_Trace 1613485189310 | 5.0 | 4.0 |
| Run 1\_Trace 1613475899841 | 4.0 | 3.0 |
| Run 1\_Trace 1613476013920 | 2.0 | 3.0 |
| Run 1\_Trace 1613489169588 | 3.0 | 4.0 |
| Run 1\_Trace 1613477450752 | 5.0 | 4.0 |
| 2.70 | 3.0 | 2.0 |
| Run 1\_Trace 1613566082521 | 4.0 | 5.0 |
| Run 1\_Trace 1613475861877 | 2.0 | 3.0 |
| Run 1\_Trace 1613476009759 | 4.0 | 3.0 |
| Run 1\_Trace 1613479570497 | 5.0 | 4.0 |
| Run 1\_Trace 1613478369301 | 5.0 | 4.0 |
| Run 1\_Trace 1613590956663 | 4.0 | 5.0 |
| Run 1\_Trace 1613490759093 | 5.0 | 4.0 |
| Run 1\_Trace 1613476005162 | 2.0 | 3.0 |
| Run 1\_Trace 1613491536779 | 3.0 | 4.0 |
| Run 1\_Trace 1613487252472 | 5.0 | 4.0 |
| Run 1\_Trace 1613490151302 | 3.0 | 4.0 |
| Run 1\_Trace 1613489562765 | 5.0 | 4.0 |
| Run 1\_Trace 1613475791219 | 3.0 | 2.0 |
| Run 1\_Trace 1613657502083 | 4.0 | 5.0 |
| Run 1\_Trace 1613478433404 | 5.0 | 4.0 |
| Run 1\_Trace 1613683346774 | 4.0 | 5.0 |
| Run 1\_Trace 1613480864612 | 3.0 | 4.0 |
| Run 1\_Trace 1613644232654 | 4.0 | 5.0 |
| Run 1\_Trace 1613489819031 | 5.0 | 4.0 |
| Run 1\_Trace 1613640131333 | 4.0 | 5.0 |
| Run 1\_Trace 1613487501176 | 3.0 | 4.0 |
| Run 1\_Trace 1613559906202 | 4.0 | 5.0 |
| Run 1\_Trace 1613647735471 | 4.0 | 5.0 |
| Run 1\_Trace 1613475998085 | 2.0 | 3.0 |
| Run 1\_Trace 1613475771250 | 3.0 | 2.0 |
| Run 1\_Trace 1613566868257 | 4.0 | 5.0 |
| Run 1\_Trace 1613479693021 | 3.0 | 4.0 |
| Run 1\_Trace 1613662440869 | 4.0 | 5.0 |
| Run 1\_Trace 1613480066006 | 3.0 | 4.0 |
| Run 1\_Trace 1613684158856 | 4.0 | 5.0 |
| Run 1\_Trace 1613565310400 | 4.0 | 5.0 |
| Run 1\_Trace 1613475918818 | 4.0 | 3.0 |
| Run 1\_Trace 1613487205683 | 5.0 | 4.0 |
| Run 1\_Trace 1613475776153 | 3.0 | 2.0 |
| 5.22 | 5.0 | 4.0 |
| Run 1\_Trace 1613475964323 | 2.0 | 3.0 |
| Run 1\_Trace 1613477755383 | 3.0 | 4.0 |
| Run 1\_Trace 1613487355531 | 3.0 | 4.0 |
| Run 1\_Trace 1613683100486 | 4.0 | 5.0 |
| Run 1\_Trace 1613483569986 | 3.0 | 4.0 |
| 5.66 | 5.0 | 4.0 |
| Run 1\_Trace 1613476012276 | 2.0 | 3.0 |
| Run 1\_Trace 1613475823658 | 4.0 | 3.0 |
| Run 1\_Trace 1613669815983 | 4.0 | 5.0 |
| 5.37 | 5.0 | 4.0 |
| Run 1\_Trace 1613477955923 | 5.0 | 4.0 |
| Run 1\_Trace 1613475826334 | 4.0 | 3.0 |
| Run 1\_Trace 1613660851108 | 4.0 | 5.0 |
| Run 1\_Trace 1613476014832 | 2.0 | 3.0 |
| Run 1\_Trace 1613635535439 | 4.0 | 5.0 |
| Run 1\_Trace 1613558687361 | 4.0 | 5.0 |
| Run 1\_Trace 1613475938452 | 2.0 | 3.0 |
| Run 1\_Trace 1613478016657 | 3.0 | 4.0 |
| 5.13 | 4.0 | 5.0 |
| Run 1\_Trace 1613479914059 | 5.0 | 4.0 |
| 5.51 | 4.0 | 5.0 |
| Run 1\_Trace 1613475893936 | 2.0 | 3.0 |
| Run 1\_Trace 1613600436392 | 4.0 | 5.0 |
| Run 1\_Trace 1613486390340 | 5.0 | 4.0 |
| Run 1\_Trace 1613580096540 | 4.0 | 5.0 |
| 5.73 | 4.0 | 5.0 |
| Run 1\_Trace 1613634201127 | 4.0 | 5.0 |
| Run 1\_Trace 1613479677894 | 5.0 | 4.0 |
| Run 1\_Trace 1613475840450 | 2.0 | 3.0 |
| Run 1\_Trace 1613491134516 | 3.0 | 4.0 |
| Run 1\_Trace 1613478394698 | 5.0 | 4.0 |
| Run 1\_Trace 1613483598584 | 3.0 | 4.0 |
| Run 1\_Trace 1613657164536 | 4.0 | 5.0 |
| Run 1\_Trace 1613482590318 | 3.0 | 4.0 |
| Run 1\_Trace 1613488910148 | 5.0 | 4.0 |
| Run 1\_Trace 1613475764287 | 3.0 | 2.0 |
| Run 1\_Trace 1613482375850 | 3.0 | 4.0 |
| Run 1\_Trace 1613475757154 | 1.0 | 2.0 |
| Run 1\_Trace 1613588758722 | 4.0 | 5.0 |
| Run 1\_Trace 1613475888836 | 2.0 | 3.0 |
| Run 1\_Trace 1613475912212 | 2.0 | 3.0 |
| 3.46D | 2.0 | 3.0 |
| Run 1\_Trace 1613475801077 | 1.0 | 2.0 |
| Run 1\_Trace 1613491301654 | 3.0 | 4.0 |
| Run 1\_Trace 1613475823047 | 4.0 | 3.0 |
| Run 1\_Trace 1613483961447 | 3.0 | 4.0 |
| Run 1\_Trace 1613690829890 | 4.0 | 5.0 |
| Run 1\_Trace 1613487555521 | 3.0 | 4.0 |
| Run 1\_Trace 1613490872711 | 3.0 | 4.0 |
| Run 1\_Trace 1613475848297 | 2.0 | 3.0 |
| Run 1\_Trace 1613475770744 | 1.0 | 2.0 |
| Run 1\_Trace 1613489852015 | 5.0 | 4.0 |
| Run 1\_Trace 1613476008652 | 4.0 | 3.0 |
| Run 1\_Trace 1613492009766 | 3.0 | 4.0 |
| 40-1\_G01\_19 | 1.0 | 2.0 |
| Run 1\_Trace 1613475943344 | 2.0 | 3.0 |
| 4.10 | 5.0 | 4.0 |
| Run 1\_Trace 1613475932532 | 2.0 | 3.0 |
| Run 1\_Trace 1613482920474 | 5.0 | 4.0 |
| Run 1\_Trace 1613475905050 | 2.0 | 3.0 |
| Run 1\_Trace 1613652256892 | 4.0 | 5.0 |
| Run 1\_Trace 1613485338574 | 5.0 | 4.0 |
| Run 1\_Trace 1613640321656 | 4.0 | 5.0 |
| Run 1\_Trace 1613489156441 | 3.0 | 4.0 |
| 3B5.3 | 3.0 | 5.0 |
| 5.61 | 5.0 | 4.0 |
| Run 1\_Trace 1613488566402 | 3.0 | 4.0 |
| Run 1\_Trace 1613475999911 | 4.0 | 3.0 |
| Run 1\_Trace 1613475945607 | 2.0 | 3.0 |
| Run 1\_Trace 1613475814712 | 4.0 | 3.0 |