

Preliminar-analysis

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Preliminar analysis

Load the CSV data in the AOV to test 3 factors with 2 levels each: * Time of day: BUSINESS_HOUR and OFF_HOUR * Week Period: WEEKDAY and WEEKEND * Serverless provider: Lambda and GCF

```
data.aov = aov(LATENCY_SECONDS ~ SYSTEM_NAME * TIME_OF_DAY * WEEK_PERIOD * OPERATION_TYPE,
               data=data)
summary(data.aov)
```

```
##                               Df Sum Sq Mean Sq  F value    Pr(>F)
## SYSTEM_NAME                   1  0.927   0.927   223.481 < 2e-16 ***
## TIME_OF_DAY                   1  0.052   0.052    12.600 0.000705 ***
## WEEK_PERIOD                   1  0.001   0.001     0.195 0.659818
## OPERATION_TYPE                1 12.416  12.416  2992.404 < 2e-16 ***
## SYSTEM_NAME:TIME_OF_DAY       1  0.008   0.008     1.871 0.175914
## SYSTEM_NAME:WEEK_PERIOD       1  0.001   0.001     0.202 0.654523
## SYSTEM_NAME:OPERATION_TYPE    1  0.987   0.987   237.824 < 2e-16 ***
## TIME_OF_DAY:OPERATION_TYPE    1  0.006   0.006     1.485 0.227169
## WEEK_PERIOD:OPERATION_TYPE    1  0.000   0.000     0.022 0.882562
## SYSTEM_NAME:TIME_OF_DAY:OPERATION_TYPE 1  0.009   0.009     2.229 0.140067
## SYSTEM_NAME:WEEK_PERIOD:OPERATION_TYPE 1  0.000   0.000     0.105 0.747158
## Residuals                     68  0.282   0.004
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Allocation of variation

```
SS = anova(data.aov)["Sum Sq"]
SST = sum(SS)
round(100*SS/sum(SS), 2)
```

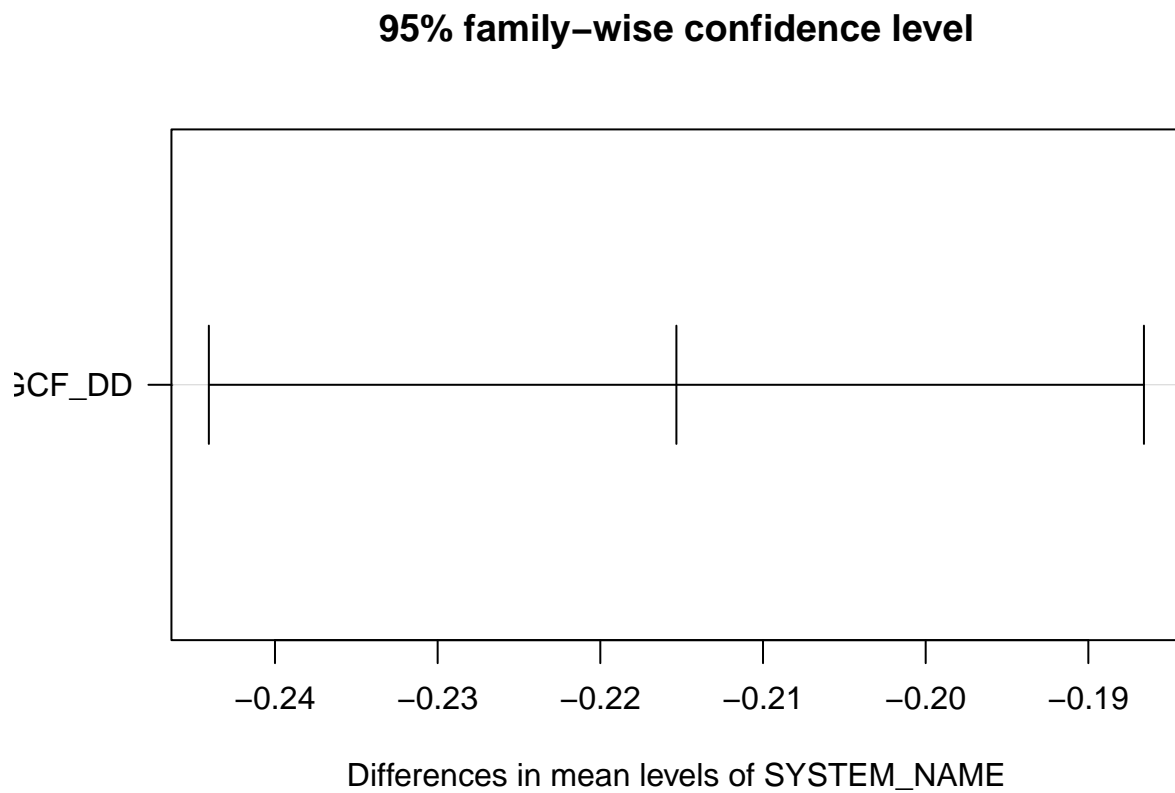
```
##                               Sum Sq
## SYSTEM_NAME                   6.31
## TIME_OF_DAY                   0.36
## WEEK_PERIOD                   0.01
## OPERATION_TYPE                84.52
## SYSTEM_NAME:TIME_OF_DAY       0.05
## SYSTEM_NAME:WEEK_PERIOD       0.01
```

```
## SYSTEM_NAME:OPERATION_TYPE          6.72
## TIME_OF_DAY:OPERATION_TYPE           0.04
## WEEK_PERIOD:OPERATION_TYPE           0.00
## SYSTEM_NAME:TIME_OF_DAY:OPERATION_TYPE 0.06
## SYSTEM_NAME:WEEK_PERIOD:OPERATION_TYPE 0.00
## Residuals                            1.92
```

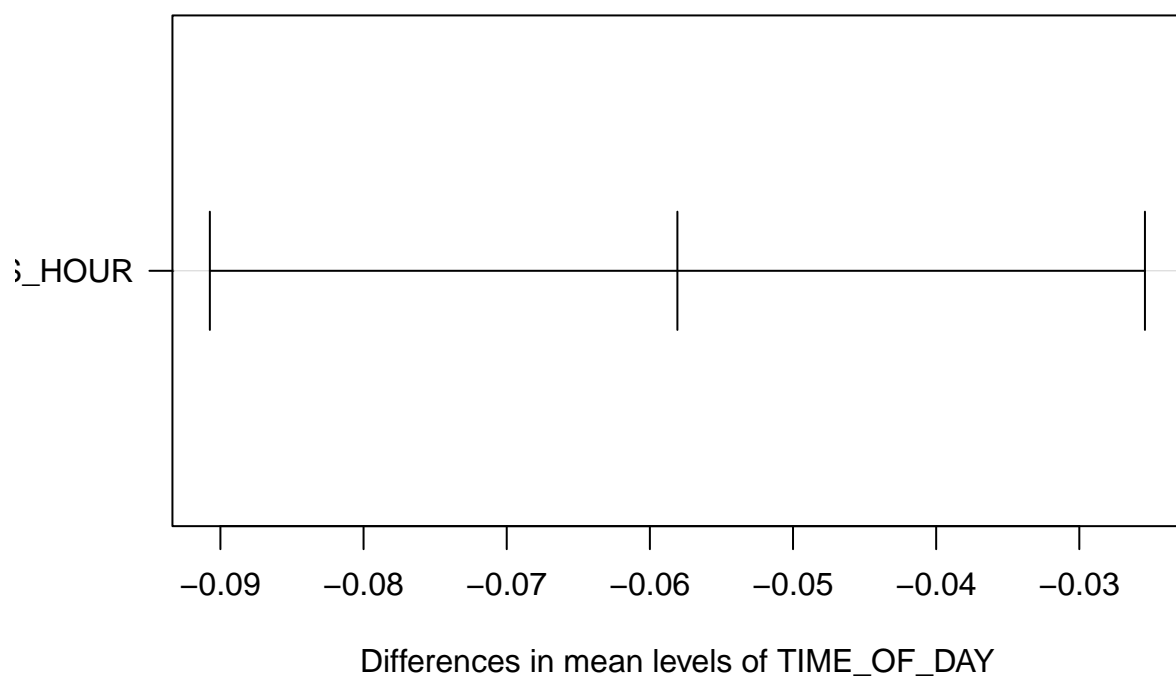
In this analysis most of the variance is coming from the serverless platform, operation type and their interaction.

Tukey test

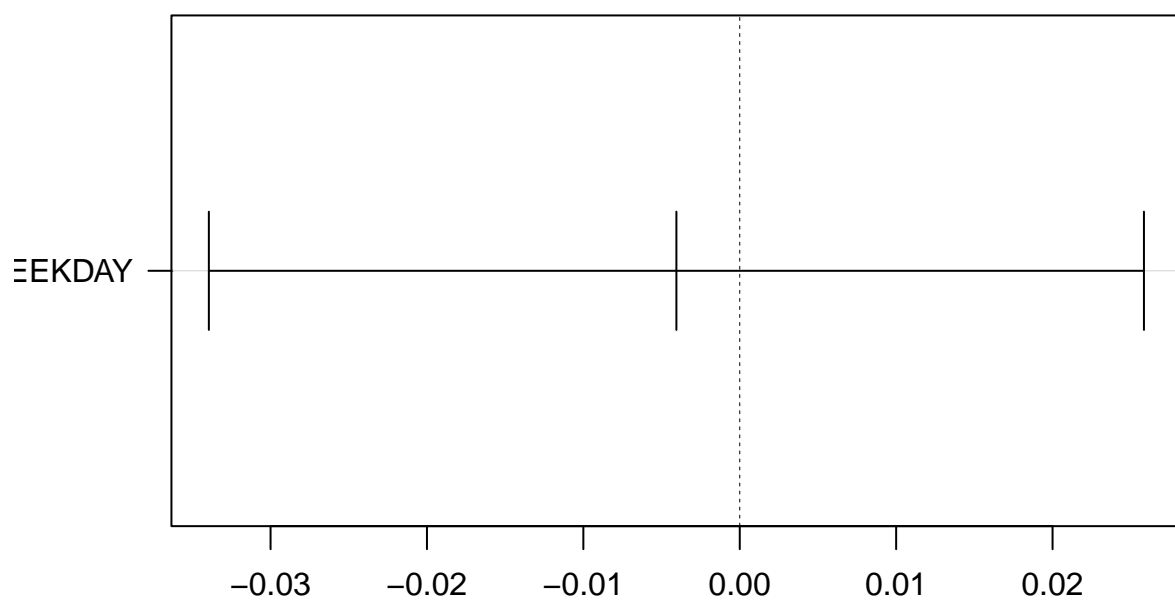
```
plot(tukey,las=1,tcl = -.6)
```



95% family-wise confidence level

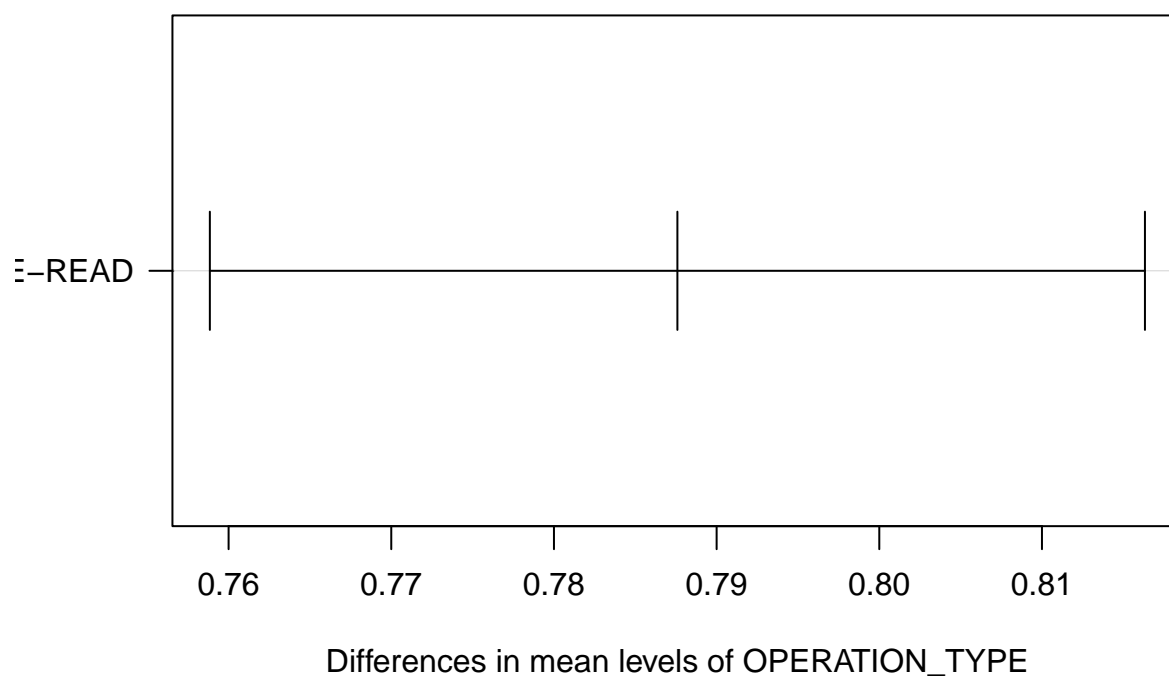


95% family-wise confidence level

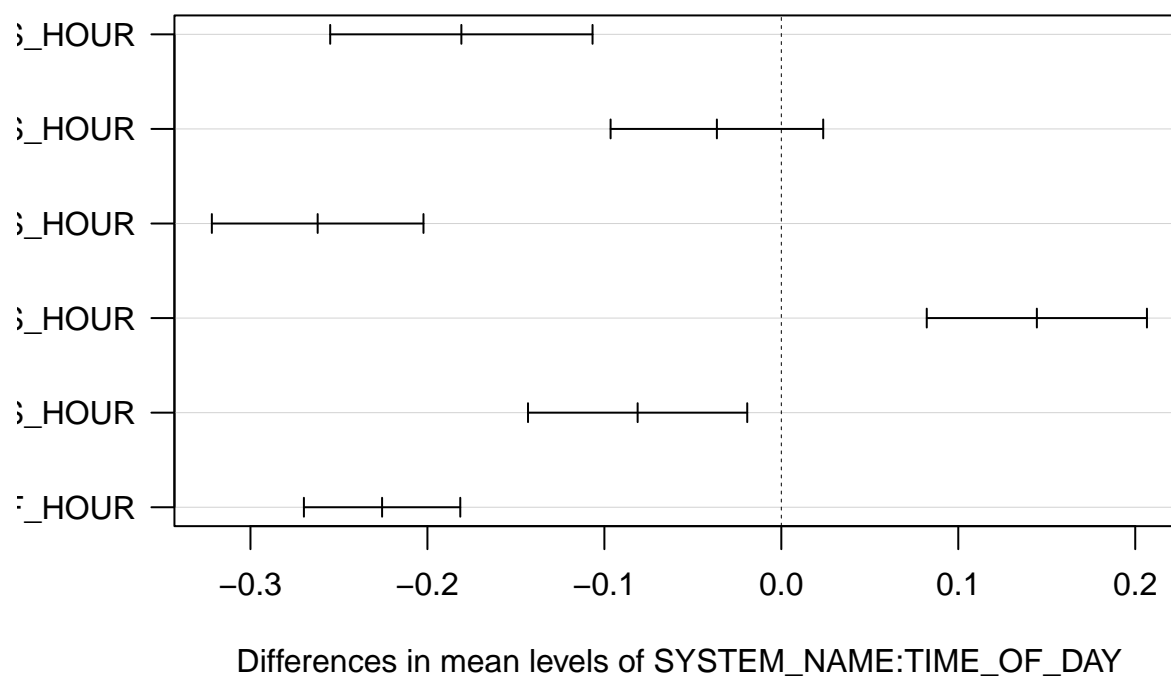


Differences in mean levels of WEEK_PERIOD

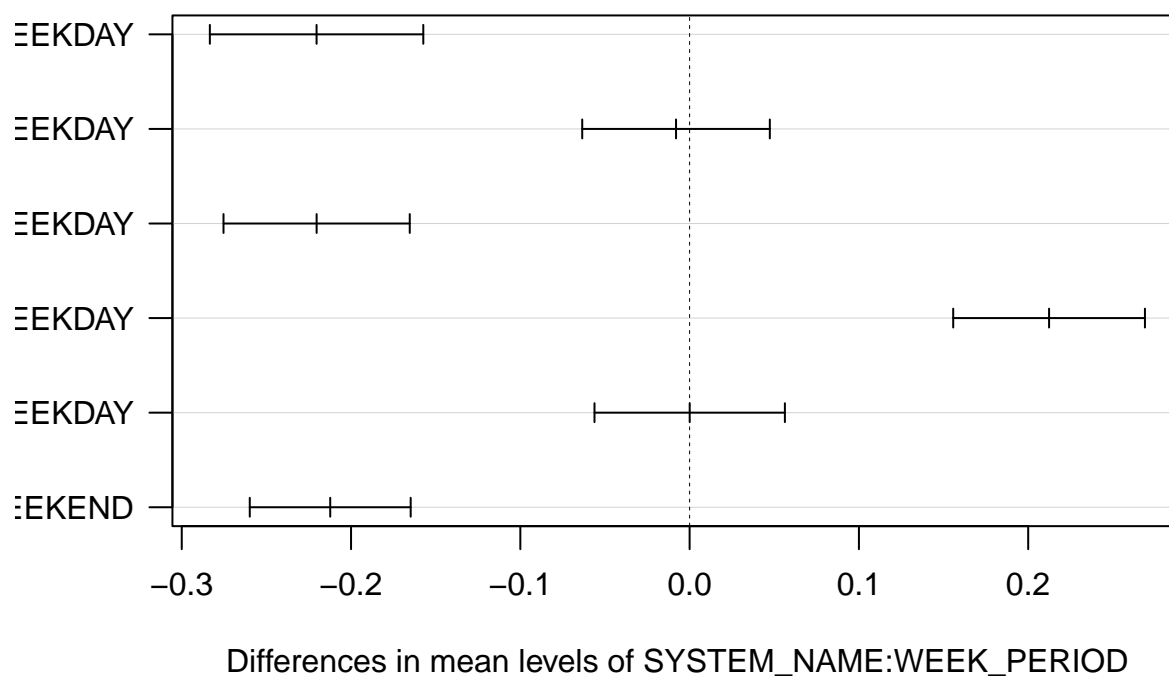
95% family-wise confidence level



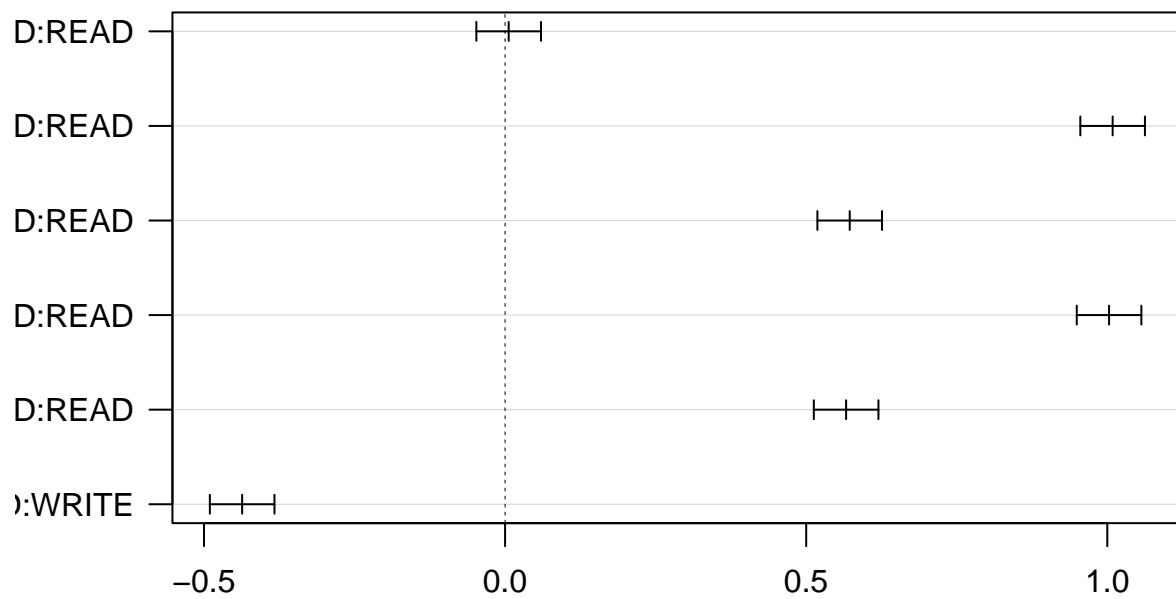
95% family-wise confidence level



95% family-wise confidence level

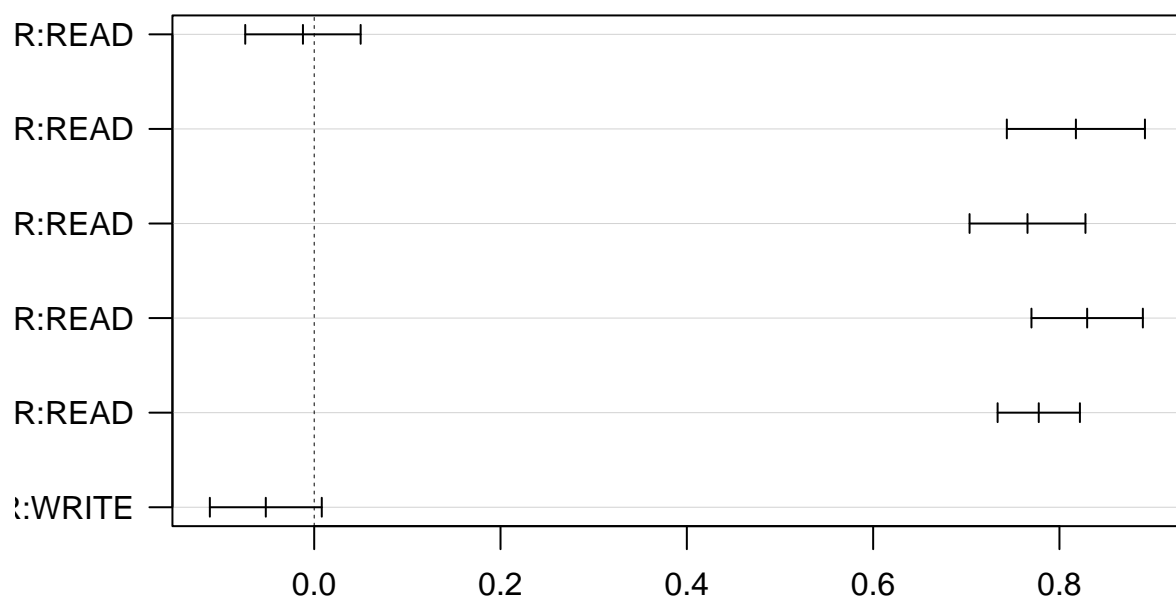


95% family-wise confidence level



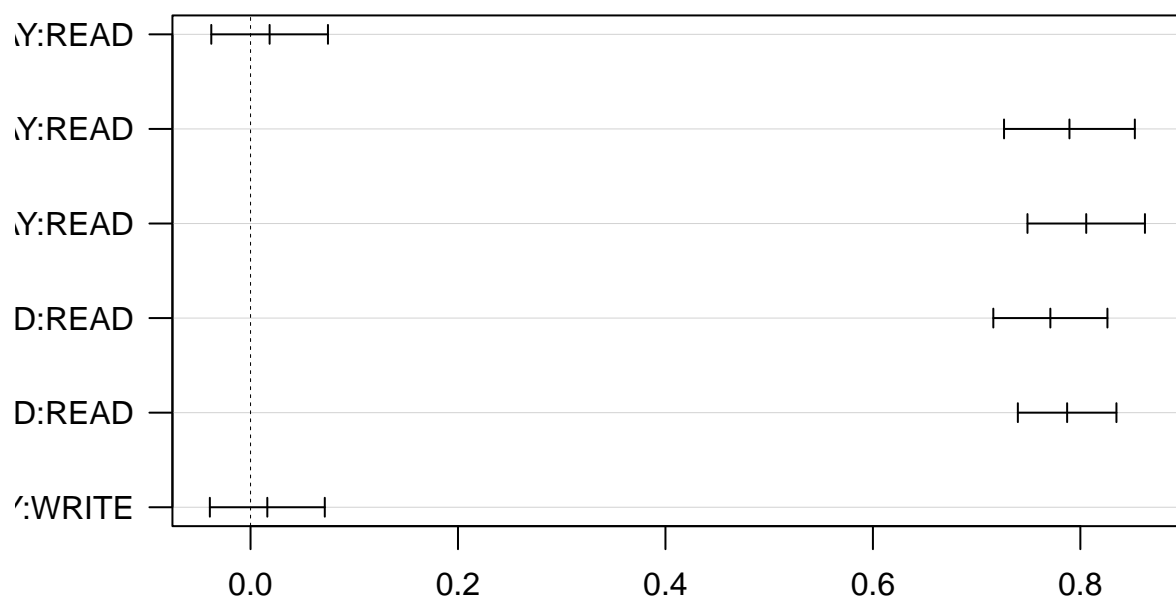
Differences in mean levels of SYSTEM_NAME:OPERATION_TYPE

95% family-wise confidence level



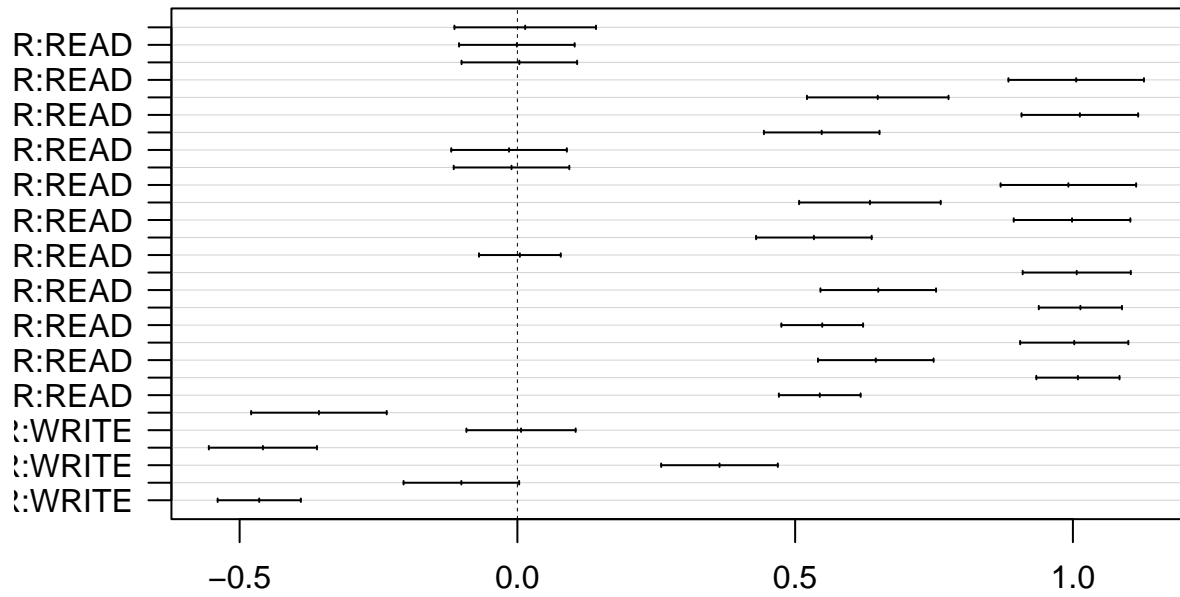
Differences in mean levels of TIME_OF_DAY:OPERATION_TYPE

95% family-wise confidence level



Differences in mean levels of WEEK_PERIOD:OPERATION_TYPE

95% family-wise confidence level



Differences in mean levels of SYSTEM_NAME:TIME_OF_DAY:OPERATION_TYPE

Forest plot showing the distribution of log-odds ratios for various operations. The y-axis lists operations: Y:READ (6 times), D:READ (5 times), and W:WRITE (3 times). The x-axis shows log-odds ratios from -0.5 to 1.0. Each operation has a horizontal line representing a distribution of values, with a central point estimate. A vertical dashed line is at 0.0.

Operation	Approximate Log-Odds Ratio (Point Estimate)
Y:READ	0.05
Y:READ	0.05
Y:READ	0.65
Y:READ	0.65
Y:READ	0.95
Y:READ	0.95
D:READ	0.00
D:READ	0.00
D:READ	0.55
D:READ	0.55
D:READ	0.95
W:WRITE	-0.40
W:WRITE	-0.40
W:WRITE	0.40

1. The confidence interval for `SYSTEM_NAME` is negative for `LAMBDA_DD` - `GCF_DD`. This means that latency time for GCF was higher, hence Lambda is faster.
2. Confidence interval for `OPERATION_TYPE` is positive for `WRITE` - `READ`. This means that write is higher, hence reads are faster as expected.
3. Lambda reads and GCF reads have no significant differences, so they are the same.
4. Confidence interval for `LAMBDA_DD:WRITE` - `GCF_DD:WRITE` is negative. This means that writes in GCF are slower than Lambda.
5. Week period is not significant.
6. Time of day is significant for 95% confidence level. Its confidence interval is negative for `OFF-HOUR` - `BUSINESS_HOUR`. This means that business hours are slower.