

# Verteilte Systeme I

## Winter Term 2019/20

### G2T1 – Assignment 1 (theoretical part)

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## 1 Transparency Levels

**a)**

The access is location transparent, because the location is hidden behind an unresolved URL.

**b)**

The service is not replication transparent because there is a unique link for every location that has to be checked separately.

**c)**

The access is replication transparent, because it is not apparent if Otto is checking one or multiple web services.

**d)**

**i.**

It is only possible to write all copies at once so all copies are always the same. That means independent from when or which copy is read the answer is always up to date.

**ii.**

Write operations are performed on  $n-1$  copies. Read operations are performed on 2 copies, the client accepts the new version.

## 2 System Models

**a)**

- No message is lost
- The maximal possible delay is known

**b)**

**i.**

$$t_i^{\text{send}}(m) = i * t$$

**ii.**

### 3 Three-Army-Problem

**a)**

**b)**

### 4 System Availability

**a)**

$$A_x = \frac{80t}{100t} = 80\%$$

$$A_y = \frac{60t}{100t} = 60\%$$

**b)**

$$A_{A_x|A_y} = \frac{80t}{100t} = 80\%$$

**c)**

$P(A_i, A_j)$  = observing node  $A_i$  as up given that node  $A_j$  is up

$$P(A_x|A_y) = \frac{60t}{60t} = 100\% \rightarrow \text{not dependent}$$

$$P(A_y|A_x) = \frac{60t}{80t} = 75\% \rightarrow \text{is dependent}$$

**d)**

The availability depends on  $A_x = 80\%$  which is equal to  $A_{A_x|A_y}$ .