

EXTENDS *Integers*

Integrity $\triangleq \forall l, f \in \text{Server}, \text{msg} \in \text{msgs} :$
 $\quad \wedge \text{state}[l] = \text{Leader} \quad \wedge \text{state}[f] = \text{Follower}$
 $\quad \wedge \text{msg.type} = \text{COMMIT} \wedge \text{msg} \in \text{histroy}[f]$
 $\quad \Rightarrow \text{msg} \in \text{history}[l]$

Consistency $\triangleq \exists i, j \in \text{Server} :$
 $\quad (\text{state}[i] = \text{Leader}) \wedge (\text{state}[j] = \text{Leader})$
 $\quad \Rightarrow i = j$

LivenessProperty1 $\triangleq \forall i, j \in \text{Server}, \text{msg} \in \text{msgs} :$
 $\quad (\text{state}[i] = \text{Leader}) \wedge (\text{msg.type} = \text{COMMIT})$
 $\quad \leadsto (\text{msg} \in \text{history}[j]) \wedge (\text{state}[j] = \text{Follower})$

$e' \triangleq \text{CHOOSE } x \in \text{Nat} :$
 $\quad \forall e \in Q : x > e$

LET $f \triangleq \text{CHOOSE } fq \in Q :$
 $\quad \forall fp \in Q : \vee fp.a < fq.a$
 $\quad \vee fp.a = fq.a \wedge fp.zxid \leq fq.zxid$

IN $Ie' \triangleq hf$

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