

APPENDIX  
ADAPTIVE ALGORITHM FOR TARGET LOC

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**Algorithm 1** UpdateTargetLOC ( $\lambda_{target}$  target LOC,  $\alpha$  throughput-weight)

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1: Local variables:  $s$  state,  $d$  direction
2:
3: if (round %  $p$ ) = 1 ...  $p-1$  then
4:   Update measures of mean normalized throughput  $xp$  and success rate  $sr$ 
5: else
6:   if  $s$  = CONVERGING then
7:     if round =  $p$  then
8:       Set initial direction  $d$  based on mean client reliability
9:        $j \leftarrow 4$ 
10:    end if
11:     $G_{last} \leftarrow G$ 
12:    Gain  $G \leftarrow \alpha * xp + (1-\alpha) * sr$ 
13:    if  $G / G_{last} \geq \delta_{mod}$  then
14:       $j \leftarrow j-1$ 
15:      Switch direction  $d$ 
16:      if  $j = 0$  then
17:         $s \leftarrow$  STEADY-STATE
18:      end if
19:    else if  $G > G_{avg}$  OR  $G / G_{last} \leq \delta_{in}$  then
20:      if  $d =$  left then
21:         $\lambda_{target} \leftarrow \lambda_{target} - 0.01*j$ 
22:      else
23:         $\lambda_{target} \leftarrow \lambda_{target} + 0.01*j$ 
24:      end if
25:    else
26:       $\lambda_{target}$  unchanged
27:      if  $\lambda_{target}$  unchanged for  $maxrounds$  rounds then
28:         $s \leftarrow$  STEADY-STATE
29:      end if
30:    end if
31:  else
32:    Gain  $G \leftarrow \alpha * xp + (1-\alpha) * sr$ 
33:    if  $G / G_{last} \geq \delta_{sig}$  then
34:       $s \leftarrow$  CONVERGING,  $j \leftarrow 4$ 
35:    end if
36:     $G_{avg} \leftarrow weight_{curr} * G + weight_{hist} * G_{avg}$ 
37:  end if
38: end if

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The algorithm above describes the adaptive algorithm for computing target LOC to be used in our reputation-based scheduling algorithms. The algorithm consists of the following empirically determined variables:

- $p$  : measurement period

- $j$  : magnitude of change in target LOC
- $\delta_{sig}$  : significant change in Gain
- $\delta_{mod}$  : moderate change in Gain
- $\delta_{in}$  : insignificant change in Gain
- $maxrounds$  : number of rounds to wait for steady-state
- $weight_{curr}$  : weight given to current measure of Gain
- $weight_{hist}$  : weight given to weighted historic average