

step 1

initialization

$u$   
 $D[u] \leftarrow u$   
 $M[u] \leftarrow true$   
 $D'[u] \leftarrow D[u]$

request  
 $D[D[u]]$

$D[u]$ : parent node  
 $M[u]$ :  $u$  modified or not  
 $M_{agg}$ : any vertex modified

$M_{agg} \leftarrow OR_{u \in V} M[u]$

step 2

data sending

if (not  $M_{agg}$ )  
voteToHalt()

reply  
 $D[D[u]]$

requests

$D[u]$

$D[v_i]$

if  $D[D[u]] = D[u]$

$dv \leftarrow \min_i D[v_i]$

if ( $dv < D[u]$ ) send  $dv$

$dv_i$

$D[D[u]] \leftarrow \min_i dv_i$

request  
 $D[D[u]]$

$M_{agg} \leftarrow OR_{u \in V} M[u]$

step 3

main computation

if  $D[D[u]] \neq D[u]$   
 $D[u] \leftarrow D[D[u]]$

step 4

remote updating

$M[u] \leftarrow D[u] \neq D'[u]$   
 $D'[u] \leftarrow D[u]$

$du$  (in step 2)