

$query(m, p_{stream}, p_i, served_SS, D)$

$$q_m^i = \arg \max_r [(p_{stream} \sum_{served_SS[n]=0} U(r - r_{m,n}) - rp_i)];$$

for $n=1$ to N ,

if $q_m^i \geq r_{m,n}$ then $served_SS_new[n]=1$;

else $served_SS_new[n]=served_SS[n]$;

end if;

end for;

for $m'=1$ to M ,

if $q_m^i \geq r_{m,m'}$ then $D_{new}[m'] \leftarrow 1$;

else $D_{new}[m'] \leftarrow D[m']$;

end if;

end for;

return ($q_m^i, served_SS_new, D_{new}$);