$$
\begin{array}{ccc}
X \otimes^{\mathbf{L}} (Y \otimes^{\mathbf{L}} Z) & \!\!=\!\!=\!\!=\!\! & \rho(\rho X \otimes \rho\rho(\rho Y \otimes \rho Z)) \\
& & \downarrow{\scriptstyle (1 \otimes c^{-2}) \circ c^{-1}} \\
& & \rho X \otimes (\rho Y \otimes \rho Z) \\
\alpha^{\rho} \downarrow & & \downarrow{\scriptstyle \alpha} \\
& & (\rho X \otimes \rho Y) \otimes \rho Z \\
& & \downarrow{\scriptstyle c \circ (c^2 \otimes 1)} \\
(X \otimes^{\mathbf{L}} Y) \otimes^{\mathbf{L}} Z & \!\!=\!\!=\!\!=\!\! & \rho(\rho\rho(\rho X \otimes \rho Y) \otimes \rho Z)
\end{array}
$$