Proposition: $H(\Omega C) = \mathrm{Cotor}^{C}(R,R)$ as an algebra.

Cor: If X is a 1-reduced simplicial set, $H(\Omega C(X)) = \mathrm{Cotor}^{C(X)}(R,R) = H(\Omega X)$ as an algebra.

Proof: Let $\tau : C \to \Omega C$, $\tau c = s^{-1}c$, be the canonical twisting morphism.

Recall the acyclic twisted tensor products (= Cartan constructions) $\Omega C \otimes_\tau C$ and $C \otimes_\tau \Omega C$ with differentials

$$d_\tau = d_\otimes + \left[(\mu\otimes 1)(1\otimes\tau\otimes 1)(1\otimes\Delta)\right] \text{ and}$$

$$d_\tau = d_\otimes - \left[(1\otimes\mu)(1\otimes\tau\otimes 1)(\Delta\otimes 1)\right], \text{ respectively.}$$

In terms of the constructions, the multiplication in differential Cotor is given by:

$$\begin{tikzcd}
\Omega C \otimes_\tau C \,\square_C\, R \,\square_C\, C \otimes_\tau \Omega C \arrow[d, "\mu"'] & = & \Omega C \otimes R \otimes \Omega C \arrow[d, "\bar{\mu}"] \\
\Omega C \otimes_\tau C \,\square_C\, C \,\square_C\, C \otimes_\tau \Omega C & = & \Omega C \otimes_\tau C \otimes_\tau \Omega C
\end{tikzcd}$$

where the map $\bar{\mu}$ is the obvious one,