The close apposition between the endoplasmic reticulum (ER) and the plasma membrane (PM) plays important roles in Ca$^{2+}$ homeostasis, signaling, and lipid metabolism. The extended synaptotagmins (E-Syts; tricalbins in yeast) are ER-anchored proteins that mediate the tethering of the ER to the PM and are thought to mediate lipid transfer between the two membranes. E-Syt cytoplasmic domains comprise an SMP domain followed by five C2 domains in E-Syt1 and three C2 domains in E-Syt2/3. Here, we used cryo-electron tomography to study the 3D architecture of E-Syt-mediated ER-PM contacts at molecular resolution. In vitrified frozen-hydrated mammalian cells overexpressing individual E-Syts, ER-PM distance (19-22 nm) correlated with the amino acid length of the cytosolic region of E-Syts (i.e., the number of C2 domains). Elevation of cytosolic Ca$^{2+}$ shortened the ER-PM distance at E-Syt1-dependent contacts sites. E-Syt-mediated contacts displayed a characteristic electron-dense layer between the ER and the PM. These features were strikingly different from those observed in cells exposed to conditions that induce contacts mediated by STIM1 and Orai1, in which the gap between the ER and the PM was spanned by filamentous structures perpendicular to the membranes. Our results define specific ultrastructural features of E-Syt-dependent ER-PM contacts and reveal their structural plasticity, which may impact on the cross-talk between the ER and the PM and the functions of E-Syts in lipid transport between the two bilayers.