Almost all eukaryotic pre-mRNAs must undergo 3'-end processing for their translation into proteins. The cleavage and polyadenylation factor (CPF, ~1MDa) is an essential component of the 3'-end machinery that cleaves the nascent mRNA, adds the 3' poly(A) tails and triggers transcription termination. Using a combination of cryo-EM, native-mass spectrometry and biochemistry, we have determined a new architecture of yeast CPF and have shown that its polymerase sub-complex (~200kDa) acts as a hub, bringing together RNA and accessory factors required for efficient polyadenylation.