Consonant harmony is complex phonological process which requires a theory-informed descriptive analysis to determine its occurrence patterns. Consonant harmony has previously been studied as an assimilatory process that involves feature spreading while recent studies describe consonant harmony as feature agreement that leads to correspondence. The current study aims to fill this gap in phonological research and specifically Dholuo phonology by studying consonant harmony. This would establish how Dholuo consonant harmony manifests and the phonological and phonetic properties determining the occurrences. The objectives of the study were: firstly, to establish the phonetic and phonological properties that define Dholuo consonant harmony, secondly, to explain the nature of correspondence in Dholuo consonant harmony and thirdly, to determine the directionality of assimilation in Dholuo consonant harmony. Prince and Smolensky’s Optimality Theory (OT) was adopted. The domain of harmony is the word which therefore forms the unit of analysis. The analytical research design was adopted in analyzing qualitative data. Native speaker intuitions helped in data generation and data extraction. The study population consisted of five radio stations that broadcast in Dholuo and two texts written in Dholuo. The researcher purposively sampled Radio Lake Victoria which broadcasts in Dholuo and recorded conversations from a specific radio programme, Duol. A total sample of five episodes was recorded and transcribed. The words which exhibited consonant harmony were extracted, transcribed phonemically and organized thematically based on the articulatory features. The data was presented in a tableau for analysis as postulated by OT. Dholuo consonant harmony manifests as a root-internal occurrence. Coronal harmony and dorsal harmony are identified based on the phonological and phonetic properties. Coronal harmony is a co-occurrence restriction between dentals and alveolars which affects only those coronals that are contrastively alveolar or dentals. The feature distributed [dist] is distinctive between the dentals and alveolars. Despite the co-occurrence restrictions, cases were attested of dentals co-occurring with alveolars. Dorsal harmony affects velar nasal and palatal nasal which are contrasted in terms of the feature [back]. Some of the Dholuo morphophonemic alternations that come as a result of grammatical change lead to consonant harmonisation. The markedness constraints that support the structural wellformedness of output actually lead to identity effects. Feature agreement is better able to explain the nature of correspondence since the participating sounds are non-local. Directionality of assimilation is left-right for root-internal coronal harmony. The root-initial consonant in Dholuo words is constant therefore the rest of the consonants in a word follow the patterns of root initial ones. OT uses positional faithfulness to protect the word-initial consonant in Dholuo. This study aims to contribute to descriptive and theoretical linguistics by enriching the study of Dholuo phonology and linguistics.