Proper Lie groupoids are real analytic

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If a group-like object exhibits a weak amount of regularity, often automatically exhibits a strong amount of regularity as well. The previous principle goes back to Hilbert's fifth problem which asked for the characterization of Lie groups without reference to the smooth structure. This question, settled by Montgomery-Zippin and Gleason, admits generalizations for transformation groups (Hilbert-Smith conjecture). In this respect, Illman showed that if a Lie group acts smoothly and properly on a manifold, then the action can be made real analytic. Group actions are particular cases of Lie groupoids (themselves group-like structures encoding partial symmetries). In this talk we shall prove that proper Lie groupoids admit compatible real analytic structures. The main tool is an adaptation of the Weyl unitary trick to local complexifications of certain types of Lie groupoids.