Disclosed are various embodiments that facilitate remote emulation of computing devices. A model of a computing device and an application that is executable in the computing device are identified. The application is executed in a hosted environment. A video signal of the application is encoded into a media stream. A user interface is encoded for rendering in a client. The user interface includes a graphical representation of the model of the computing device. A screen of the graphical representation of the model of the computing device is configured to render at least a portion of the video signal from the media stream.