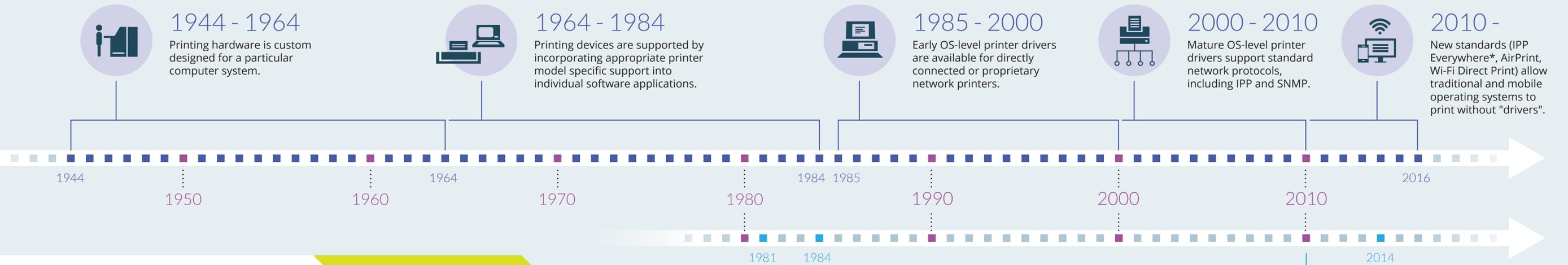


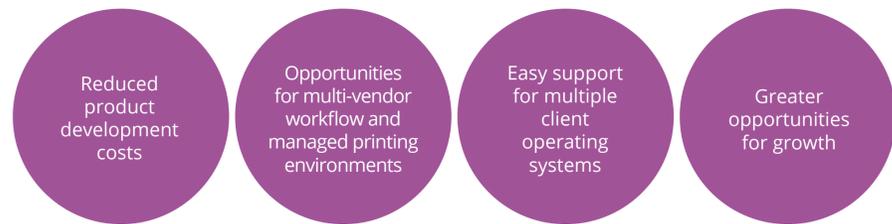
IPP 3D Printing Extensions

While the new IPP "driverless" standards in 2D printing are commonly used in the market, 3D printing is still based on USB device connections that use unique and frequently proprietary application software tailored for a specific printer. IEEE ISTO Printer Working Group (PWG) is extending its Internet Printing Protocol (IPP) and PWG Semantic Model to support feature detection, job monitoring and printing to any IPP 3D printer without needing proprietary drivers or software.

2D/3D Print Industry Timeline

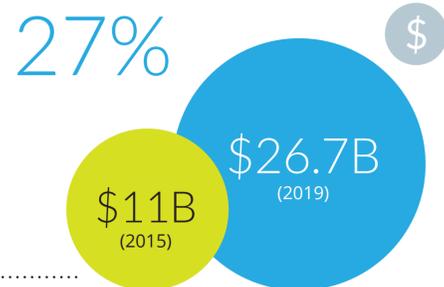


The Benefits of Common Interfaces/Network Protocols



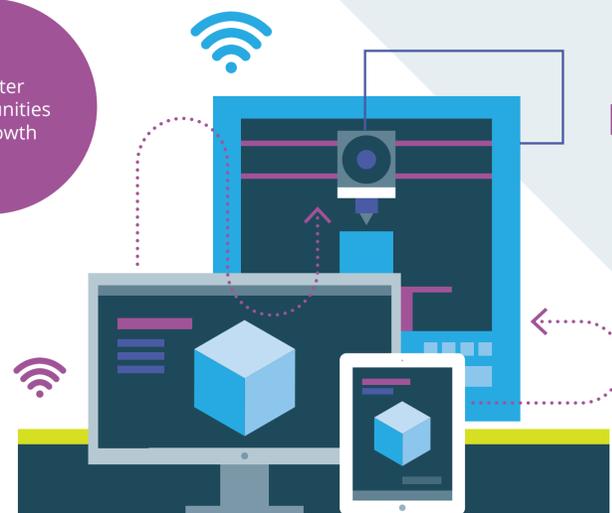
Lower Development Costs for Manufacturers

The global market intelligence and advisory services providers are predicting that 3D printing will expand globally at a 27% compound annual growth rate from 2015 to 2019:

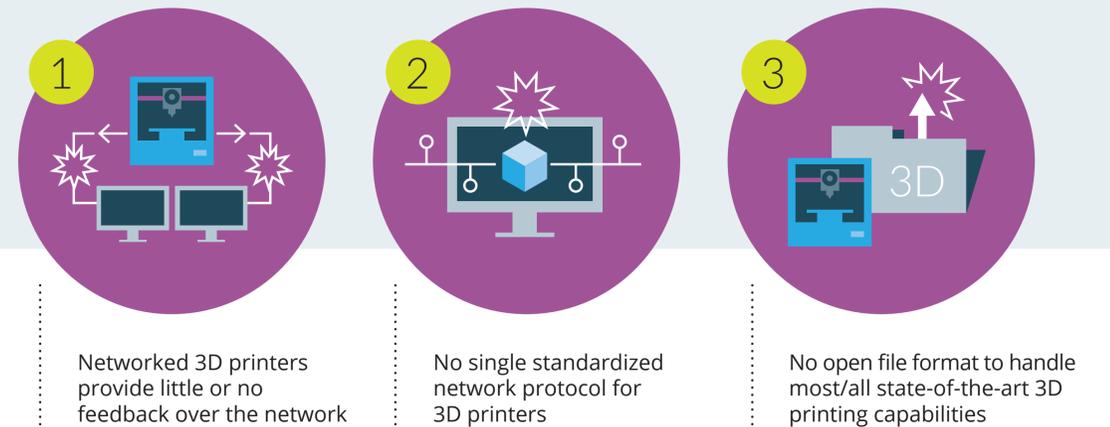


Also, through the first three quarters of 2015, worldwide shipments of 3D printers rose 35%

+35%



Meanwhile:



Adopting Standards in 3D

3D printers should take advantage of the 50+ years of traditional 2D printing to offer high-level, networked, and cloud-aware printing services to client devices running any operating system. The PWG's current efforts can help the 3D community adopt "driverless" printing immediately, therefore speeding interoperability and helping the 3D community embrace mobile and cloud technologies.

SOURCES: <https://www.pwg.org/>, <http://www.deskeng.com/>, <https://www.preceden.com/>, <http://3dmasterminds.com/>, <http://www.3ders.org/>, <https://3dprint.com/>, <https://www.idc.com>, <http://www.digitaltrends.com/>, <http://libgraphicsworld.org/>

IPP Everywhere®

IPP saves enormous amounts of custom code and allows strong interoperability across manufacturers for common features. Accordingly, manufacturers could use IPP to avoid some custom software costs, thereby being in a better position to address price pressures.

* IPP Everywhere® is a PWG Candidate Standard that defines minimum requirements for clients and printers so that personal computers and mobile devices can find and print to networked and USB printers without using special software. The goal is to make printing as simple as connecting a keyboard or mouse.

