

## 3D Printing BOF Meeting Minutes February 4, 2015

Meeting was called to order at approximately 10:45am PT February 4, 2015.

### Attendees

Russell Brudnicki (Kyocera Document Solutions - call in)  
Smith Kennedy (HP)  
Daniel Manchala (Xerox)  
Ira McDonald (High North - call in)  
Joe Murdock (Sharp)  
Jesse Sanchez (Intel)  
Ole Skov (MPI Tech)  
Mike Sweet (Apple - call in)  
Paul Tykodi (TCS - call in)  
William Wagner (TIC)  
Rick Yardumian (Canon)

### Agenda Items

1. IP Policy/Minutes
  - a. IP policy announced, Mike Sweet taking minutes
2. White Paper - IPP 3D Printing Extensions (Mike)
  - a. <http://ftp.pwg.org/pub/pwg/BOFs/3d-printing/wd-apple-ipp3d-20150123.pdf>
  - b. Extruder vs. Marker
    - Continue to investigate whether the Extruder and its supplies cleanly map to the existing Marker and MarkerSupply/Colorant properties
    - Units - g/kg and m/mm for filament, l/ml for liquids?
  - c. 4.1.x: Functional vs. physical subunits?
    - E.g., motors might be used by/part of markers/extruders
    - Do we want to associate components with functional subunits, or just expose functional subunits?
      - Worth more discussion
      - Most of current Printer MIB is functional subunits
  - d. Q: Seems like there is a lot of low-level device stuff here and no standard 3D PDL, is that appropriate for IPP?
    - A: Right now there is no standard 3D PDL, trying to define an initial mapping to current G-code/S3G with some higher-level job ticketing/capabilities/status
    - Also current networked 3D printers basically provide a raw socket interface
  - e. Q: Is there a 3D Printer MIB?
    - A: No

- f. Q: Would there be interest from manufacturers in supporting SNMP?
  - A: Maybe, should include this in discussions with vendors
- g. Long-lived connections are a concern - prints may take days to complete
  - Most printers cannot spool, everything must be streamed
  - Add a DTLS binding to deal with address changes/lost connections?
- h. Reservoirs
  - More like input tray than marker supply
  - Container for build material
  - Source material for the current layer being printed on the build platform
  - Needs more discussion
- i. Do we need a waste subunit for the bits of 3D objects that are removed (supports, etc.)
  - What about dissolvable material for supports - print then drop in the solvent to clean, then remove?
  - Sort of like finishers for post-print processing
- j. Pictures needed!
- k. Q: Are we getting too involved in the details of mechanism?
  - A: We should define a "line" for how far we go for this first effort
  - Important to be able to report state and monitor for failures and pending failures
  - Identify key state that we need to monitor: extruder head, filament, etc.
  - Make detailed metrics out-of-scope initially
- l. URI for cameras (to view in browser)
- m. Continue to discuss white paper on 3d-printing@pwg.org list.
- n. Maybe schedule conference call(s) to discuss over the phone
  - SurveyMonkey/DoodlePoll to find an agreeable time?
  - Maybe also use Cloud WG time slot when there is no Cloud WG business?
- o. Do more outreach?
  - Anne Price is doing some of this
  - Bill has another company (Solid Scape) he can contact
- p. Should include Cloud in use cases - obvious case both for managed printers and paid print services.

## Next Steps / Open Actions

- Continue to discuss white paper on 3d-printing@pwg.org list and potential conference call.
- Reach out to 3D printer manufacturers
- Action: Mike and Paul to contact ASTM about opening AMF spec (ONGOING)