3D Printing BOF Meeting Minutes
August 11, 2015

Meeting was called to order at approximately 10:30am PT August 11, 2015.

Attendees

Russell Brudnicki (Kyocera Document Solutions)
Adam Just (Samsung - call in)
Paul Henerlau (Sharp)
Smith Kennedy (HP - call in)
Daniel Manchala (Xerox - call in)
Ira McDonald (High North - call in)
Joe Murdock (Sharp)
Ole Skov (MPI Tech)
Brian Smithson (Ricoh)
Alan Sukert (Xerox - call in)
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. Slides:
    a. http://ftp.pwg.org/pub/pwg/BOFs/3d-printing/3d-bof-august-2015.pdf
    b. Scenarios:
        - Web service: form submission of files, specification of job ticket
        - IPP service: direct submission of files with job tickets
        - Hybrid: form submission of document and job ticket files
        - Goal is to be able to support "smart" applications to eliminate manual submission/job ticketing processes
    c. 3MF:
        - Continue looking at this
        - Could propose using PWG Print Job Ticket (with 3D extensions) as the embedded XML job ticket format (rather than MSPS)
        - For IPP you'd want to send the job ticket via IPP instead of embedding it
        - Concerned about disk/CPU usage for OPC container
            - Need to be able to scale from low-end Raspberry Pi class controllers to larger computer systems
    d. Q: Should we decouple IPP/SM extensions from selection of a recommended format?

        - A: Yes, although we need to look at existing formats to determine how we associate materials and other job ticket elements with the content in the document
    e. Job ticket will likely convey information to the operator of the printer (to load the right materials, etc.) for print services
        - Likely be making recommendations on how to map materials to the document data
        - Single material jobs apply the same material to the whole document, named materials get mapped from job ticket, etc.
        - Try to manage expectations/job ticket
    f. Q: What is inside vs. outside
        - A: Objects are closed solids (even with holes - the edges have thickness), inside is between two surfaces in the closed object
    g. Q: What about material properties - thermal characteristics, etc.
        - A: We can add attributes to further specify material characters, but for now we'd like to keep it as simple as possible
    h. Q: Are the Transaction-Based Printing Extensions sufficient for 3D Print jobs?
        - A: Probably, but will review at a future F2F
        - Prepare sequence diagram for the next BOF
        - Review 5100.16 at the next BOF as well
3. White Paper - IPP 3D Printing Extensions (Mike):
    a. http://ftp.pwg.org/pub/pwg/BOFs/3d-printing/wd-apple-ipp3d-20150729-rev.pdf
    b. Q: Should we mention hybrid solutions in the introduction?
        - A: Maybe, certainly in the model section
    c. Section 2.2: Add ODL (Object Definition Language)
    d. Table 1: Mark up table to show what is new
    e. Section 4.3:
        - Line 349: "isoutside" -> "is outside"
    f. Q: "material-diameter" vs. "media-thickness"
        - Not quite the same - media-thickness applies to a general, interchangeable output media, media-diameter is an implementation detail of the printers
        - users generally only care about speed
    g. Section 5.1.1.4:
        - Add example of hyphenated type (pla-flexible?)
        - Maybe add example of hyphenate form for complex types?
        - Note that underscore is reserved for separating type from form
        - Add wax material
    h. Section 5.1.1.5:
        - Add 'all' value
4. Next steps:
    a. Q: Adopt as new work for the PWG/IPP WG?
        - Do we have enough interested participants? We have a few vendors (Adobe and Ultimaker) that have expressed interest and provided feedback

    - A: Not yet, perhaps continue working with interested people in conference calls between F2F meetings to make further progress?
    - Paul, Mike, Ira, Smith will work to get the word out, work on messaging
    - Action: Mike to send conference call invitations for 3D Printing
    - Action: Ira to work with Anne to do a call for participation in 3D Printing
  b. Q: Other people to invite?
    - Adobe, Autodesk, Ultimaker, Makerbot, 3D Systems, MCOR Technologies, Microsoft, 3MF Consortium
    - Cloud 3D Printing vendors?
      - Cloud DDM setting up printers at UPS centers

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 to send conference call invitations for 3D Printing
- Action: Ira to work with Anne to do a call for participation in 3D Printing
- Action: Mike and Paul to contact ASTM about opening AMF spec (ONGOING)