The Printer Working Group

3D Printing Mini BOF

August 13, 2014

PWG F2F Meeting

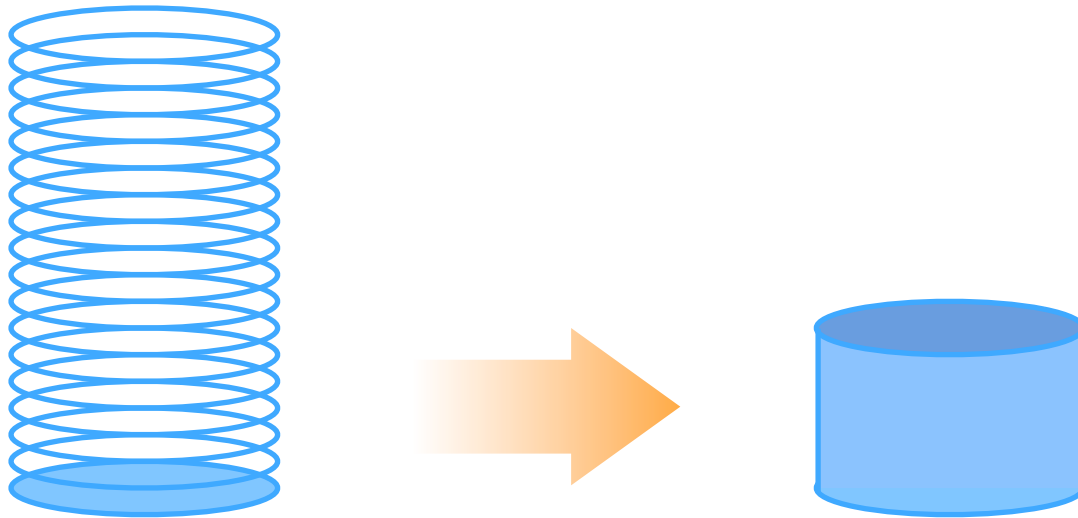Toronto, ON

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Purpose of this BOF

- Provide a brief overview of 3D Printing
- Discuss whether the PWG Semantic Model is applicable to 3D Printing
  - If so, what kinds of changes would be required to support it?
- Discuss whether the PWG should continue to hold 3D Printing BOFs
  - If so, what additional vendors, organizations, and/or individuals should be invited to participate

Introduction

- 3D Printing is a marketing term/name for Additive Manufacturing

- Material is added to form 3D objects, typically in horizontal layers:

- Most 3D printing uses a single source material to produce a finished object, for example "blue PLA filament".
- Output often uses "rafts" and other support structures to maintain the shape of objects while they are printed.
  - These supports are removed after printing, either manually (break them off by hand) or with finishing hardware.
- Printing can be very slow, although speeds continue to improve with every new generation of products.
- Common printer faults such as running out of the source material can cause ruined prints.

Introduction

- End User software is mainly designed for experts and dedicated "makers".
    - Sizing/scaling is not well defined.
    - Objects often need to be "water tight" to work with layering software.
    - Rafts and other support structures can affect the usable build volume.
    - End Users need a detailed understanding of the capabilities and limitations of the printer and software being used.
- Networked printers typically provide little or no feedback to the client device - most errors are only reported on the printer.
    - So End Users need to monitor the printer closely for issues to prevent a failed print.

- Common file formats:
  - 3DMF, Collada, DXF, OBJ, STL, VRML97, X3D: 3D object definition formats that are
  - AMF, G-code: Layer definition/instruction formats
- Network protocols:
  - Tegh: RESTful web service API
  - S3G: Makerbot network protocol
  - Various vendor-specific solutions

Is the Semantic Model Applicable to 3D Printing?

- Device/service model?
- Job model?

What Can the PWG Offer for 3D Printing?

- Semantic Model extensions
  - Job Ticket elements
  - Service Capability/Description/Status elements and values
  - Services and Operations
  - Device Capability/Description/Status/Subunit elements and values

- Registration of MIME media types for standard file formats

- Network protocol bindings: IPP, SOAP, RESTful API/ RPC?

- Common security model

Should the PWG Continue the 3D Printing BOFs?

- When to hold them?
- Where to hold them?
- Who to invite?
- What are the topics?
- What is the scope of the discussions?
- Do we foresee formation of a new workgroup or adoption of new chartered work?
  - If so, who will do the work?
  - Volunteers?