FDM AND POLYJET
SIMILARITIES AND DISTINCTIONS

FRED FISCHER

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WE ARE

THE 3D PRINTING SOLUTIONS COMPANY

EVERY 3D PRINTING AND ADDITIVE MANUFACTURING
TECHNOLOGY AND SOLUTION

FROM SYSTEMS TO SERVICE

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Additive Manufacturing

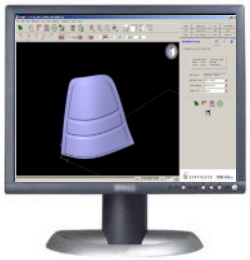
Known by many names:

- 3D Printing
- Rapid Prototyping
- Rapid Tooling
- Rapid Technologies
- Rapid Manufacturing
- Advanced Manufacturing
- Additive Fabrication
- Additive Layer Manufacturing
- Direct Digital Manufacturing
- Direct Manufacturing

Additive Manufacturing

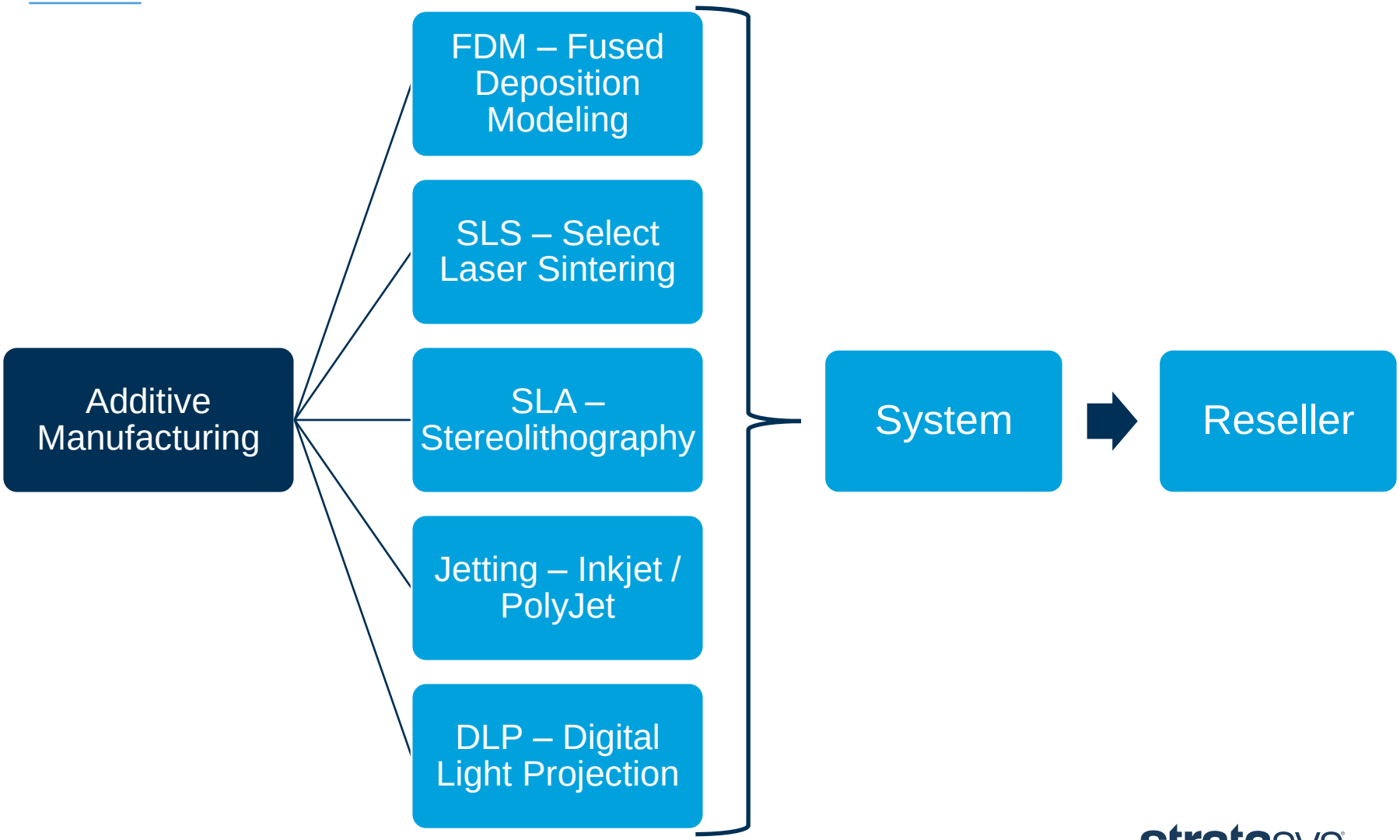
Definition:

- Collection of technologies, directly driven by CAD data, to produce 3-Dimensional physical models and parts through an additive process.



1- Pre-Process **2- Produce Part** **3- Post Process**

Additive Manufacturing Technologies



FDM & PolyJet Technologies

Distinctly different

- Yet, surprisingly similar

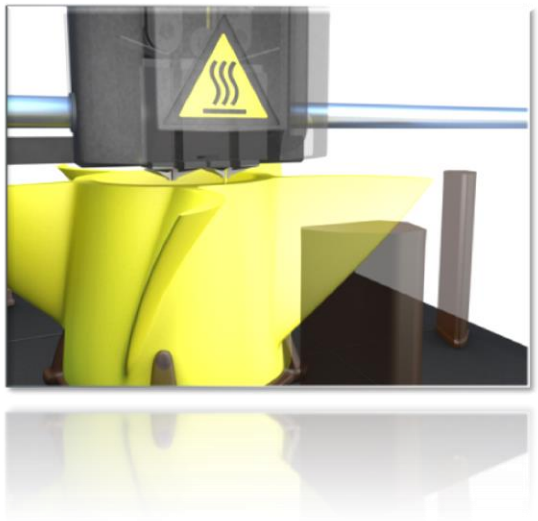
Spanning:

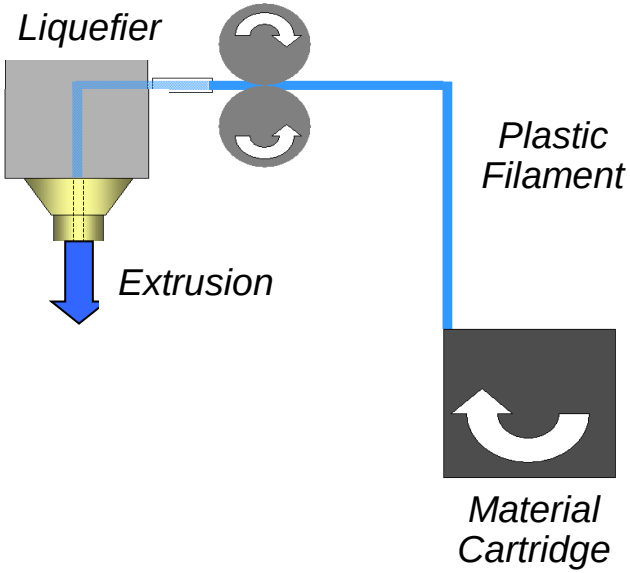
- Desktop to factory floor
- Models to manufacturing

The Technologies

Fused Deposition Modeling (FDM)

- Thermoplastics
- Extrusion

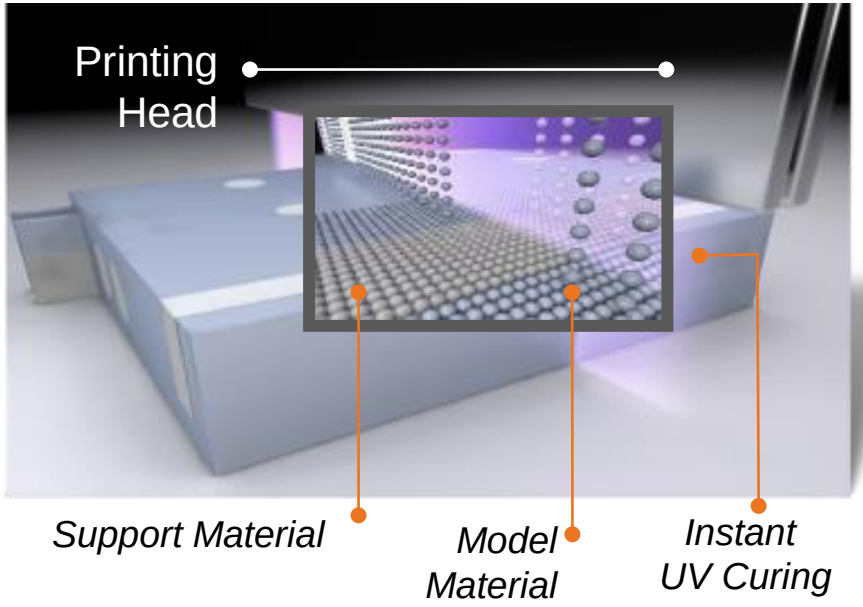




The Technologies

PolyJet 3D Printing

- Photopolymers
- Inkjet deposition



Compare & Contrast

Categories

- Operations
- Part characteristics
- Material options

	PolyJet 3D Printing	Fused Deposition Modeling (FDM)
Operations		
Process Time		
Pre-process		
Post-process		
Office Environment		
Ease of Use		
Part Characteristics		
Surface Finish		
Feature Detail		
Accuracy		
Size		
Material Options		
Rigid		
Flexible		
Durable		
Transparent		
High-performance		
Bio-compatible		

Operations

Speed

- Build speed
  - Not best measure
  - Perceptions can be incorrect
- Total process time
  - No clear distinction

Operations

Pre-processing

- Both
  - Simple, straight forward
- FDM
  - Advanced controls
  - Settings to match requirements

Operations

Post-processing

- PolyJet
  - Waterjet removal - manual
- FDM
  - Soluble - automated
  - Breakaway - manual

Operations

Office environment

- Both
  - Anywhere in floor plan
  - Just power and water supply

Operations

Ease of use

- Both
  - Simple material swapping
  - Simple, quick setup
  - Immediate part removal

Operations

Operating expense

- FDM
  - Smaller investment
  - Build sheets, tips and materials
- PolyJet
  - Materials
  - Print heads
  - Miscellaneous

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Operations Summary

	PolyJet 3D Printing	Fused Deposition Modeling (FDM)
Operations		
Process Time		
Pre-process		
Post-process		
Office Environment		
Ease of Use		

Part Characteristics

Surface finish

- PolyJet
  - Nearly paint-ready
  - Smooth, glossy
- FDM
  - Visible layer lines and extrusion paths
  - Options: mass finishing and smoothing station

Part Characteristics

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Part Characteristics

Resolution & feature detail

- PolyJet
  - Aesthetics
    - Text, texture, pins
- FDM
  - Mechanical/structural
    - Ribs, bosses, gussets

Part Characteristics

Accuracy

- Both
  - Comparable when built
- FDM
  - Dimensionally stable
    - Over time
    - With environmental exposure

Part Characteristics

Part size

- Both
  - Medium to extra large
    - 400 in^3 to 18 ft^3 (6,550 cc to 0.5 $m^{3)}$
  - Consider part size and orientation
- FDM
  - Small
    - Entry level (Mojo) – 125 in^3 (2,050 cc)

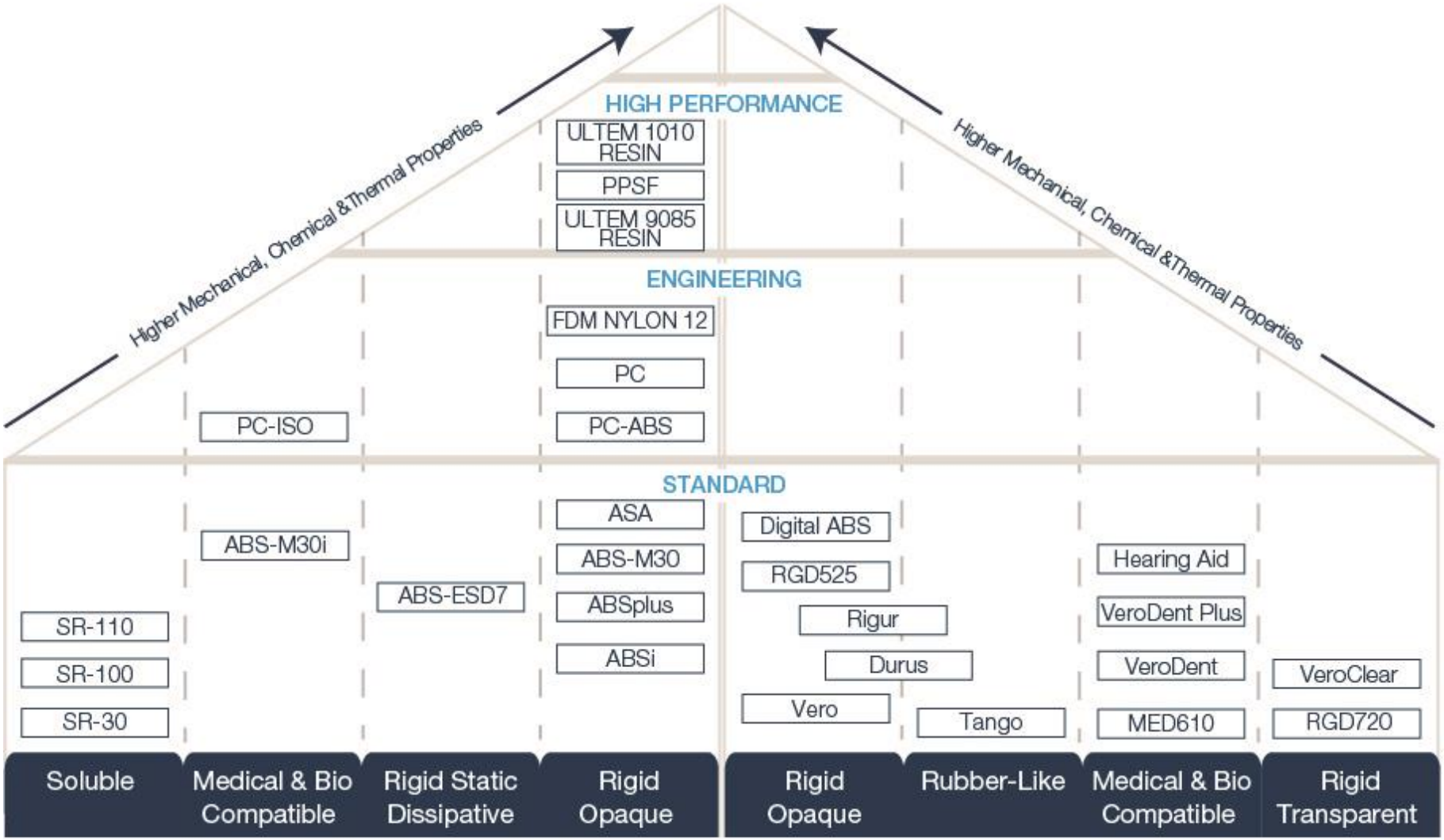
Part Characteristics Summary

	PolyJet 3D Printing	Fused Deposition Modeling (FDM)
Part Characteristics		
Surface Finish	●●●	●
Feature Detail	●●●	●
Accuracy	●●	●●●
Size	●●●	●●●

Material Options

Distinctive characteristics

- Hundreds of options
  - Photopolymers
    - Primary materials
    - Digital materials
  - Thermoplastics



PERFORMANCE PRECISION

Materials - PolyJet

PolyJet - photopolymers

- Product realism; breadth
  - Rubber-like to rigid
  - Transparent to opaque
- Digital materials
  - Blend on the fly
  - One build – multiple materials
  - One part – up to 14 materials

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Materials - FDM

FDM - thermoplastics

- Advanced performance
  - ABS to ULTEM™
  - Meet application-specific demands
  - Strength, durability
  - Chemical & heat resistance
  - FST

Material Options Summary

PRECISION

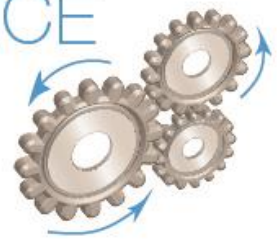
POLYJET TECHNOLOGY

- Acrylic plastics and elastomers
- Smooth surface finish and fine details
- Final product look and feel
- Multi-material printing

PERFORMANCE

FDM TECHNOLOGY

- Real thermoplastics
- Strong, stable and durable parts
- Final product mechanical properties
- Low total cost of ownership



	PolyJet 3D Printing	Fused Deposition Modeling (FDM)
Materials		
Rigid	● ● ●	● ● ●
Flexible	● ● ●	◗
Durable	● ◗	● ● ●
Transparent	● ● ●	●
High-performance	●	● ● ●
Bio-compatible	● ● ●	● ● ●

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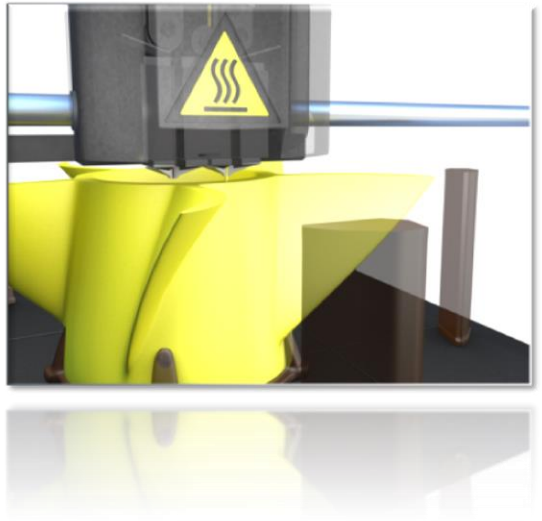
FDM & PolyJet

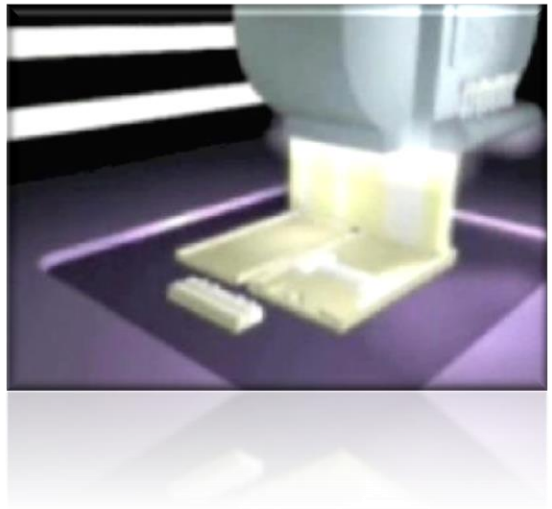


Distinct, yet similar

- Operations
- Part characteristics
- Material options

Select - match to application requirements

- Models to manufacturing
- Manufacturing to medical



FDM + PolyJet

- Combine to address broad range

More Information

www.stratasys.com/webinar-FDM-PolyJet

- Download white paper
- View recorded webinar & download slides
- Contact us to learn more or get a sample part

Questions?

More information:

www.stratasys.com/webinar-FDM-PolyJet

FDM & PolyJet Comparison

	PolyJet 3D Printing	Fused Deposition Modeling (FDM)
Operations		
Process Time	●●●	●●◖
Pre-process	●◖	●●●
Post-process	●●●	●●●
Office Environment	●●●	●●●
Ease of Use	●●●	●●●
Part Characteristics		
Surface Finish	●●●	●
Feature Detail	●●●	●
Accuracy	●●	●●●
Size	●●●	●●●
Material Options		
Rigid	●●●	●●●
Flexible	●●●	◖
Durable	●◖	●●●
Transparent	●●●	●
High-performance	●	●●●
Bio-compatible	●●●	●●●

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