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Substance

AAA Textures for Tegra

Sébastien Deguy, Founder and CEO

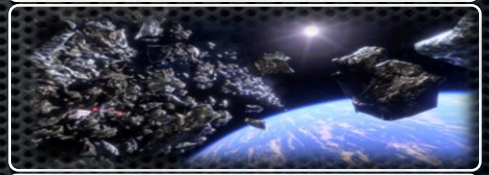
Alexis Khouri, VP Strategy and Sales

Game Sauce, Seattle, July 19th, 2010

From the lab to the shelves

- Founded in 2003
- Bringing PhD work to the market
- Patented technologies for procedural texturing
- 25 people
  - R&D team: extremely talented geeks
  - In-house studio (QA, testing, demos, production)
  - Dedicated support team
- Based in France, California, China and South Korea

Client/game portfolio extract: mostly MMOs



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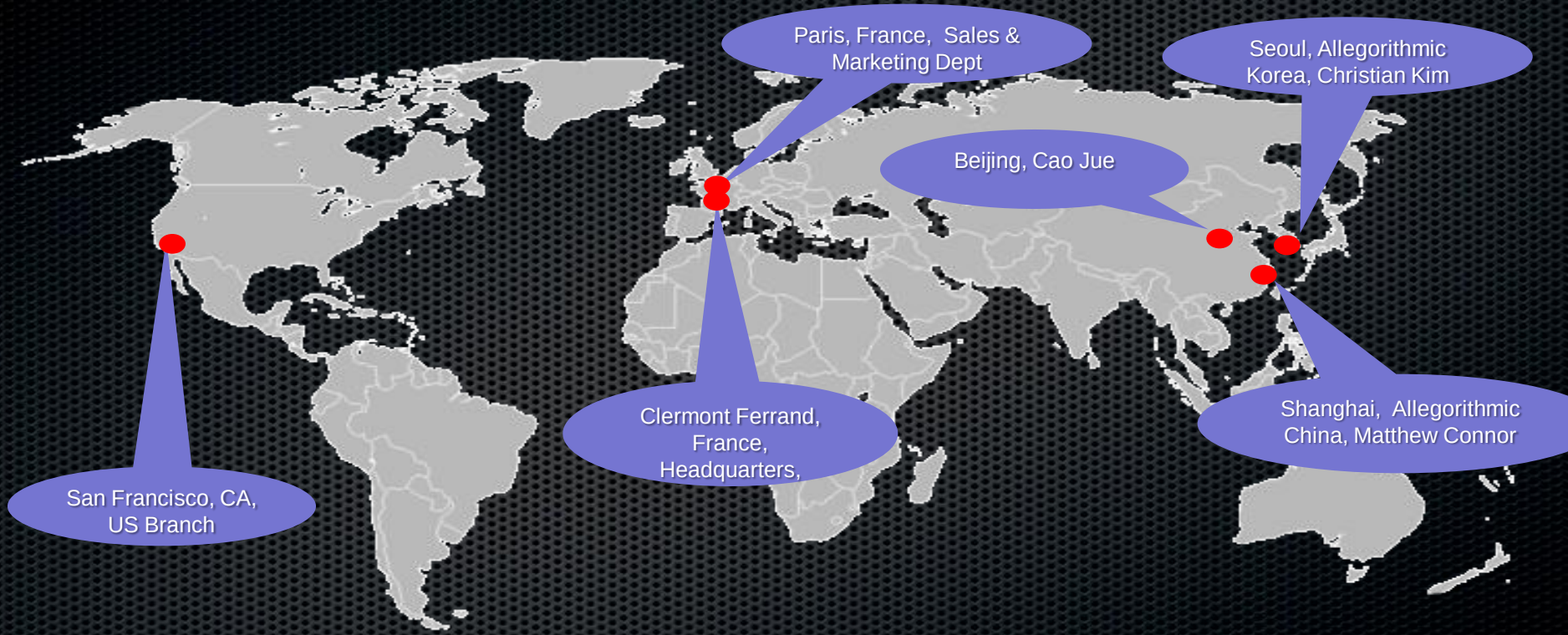
Allegorithmic's Presence Worldwide



3D Games on Tegra: A Brand New World

- A unique device with the proper graphics capabilities
- New market opportunities for developers
- An ecosystem of tools being created/ported

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Game Engines for Tegra

Top level engines already (or soon) available for the platform

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Potential Issues

- Distribution Constraints: size of 3D games very high compared to 2D games
  - High abortion rate Vs download time
  - Carriers start limiting bandwidth
  - Battery life: a lot of energy used while downloading content
- Mobile game devs lack experience in 3D
  - No experience in high end 3D due to current smartphone graphic limitation
  - Look-alike games
  - Less time and money spent on creativity

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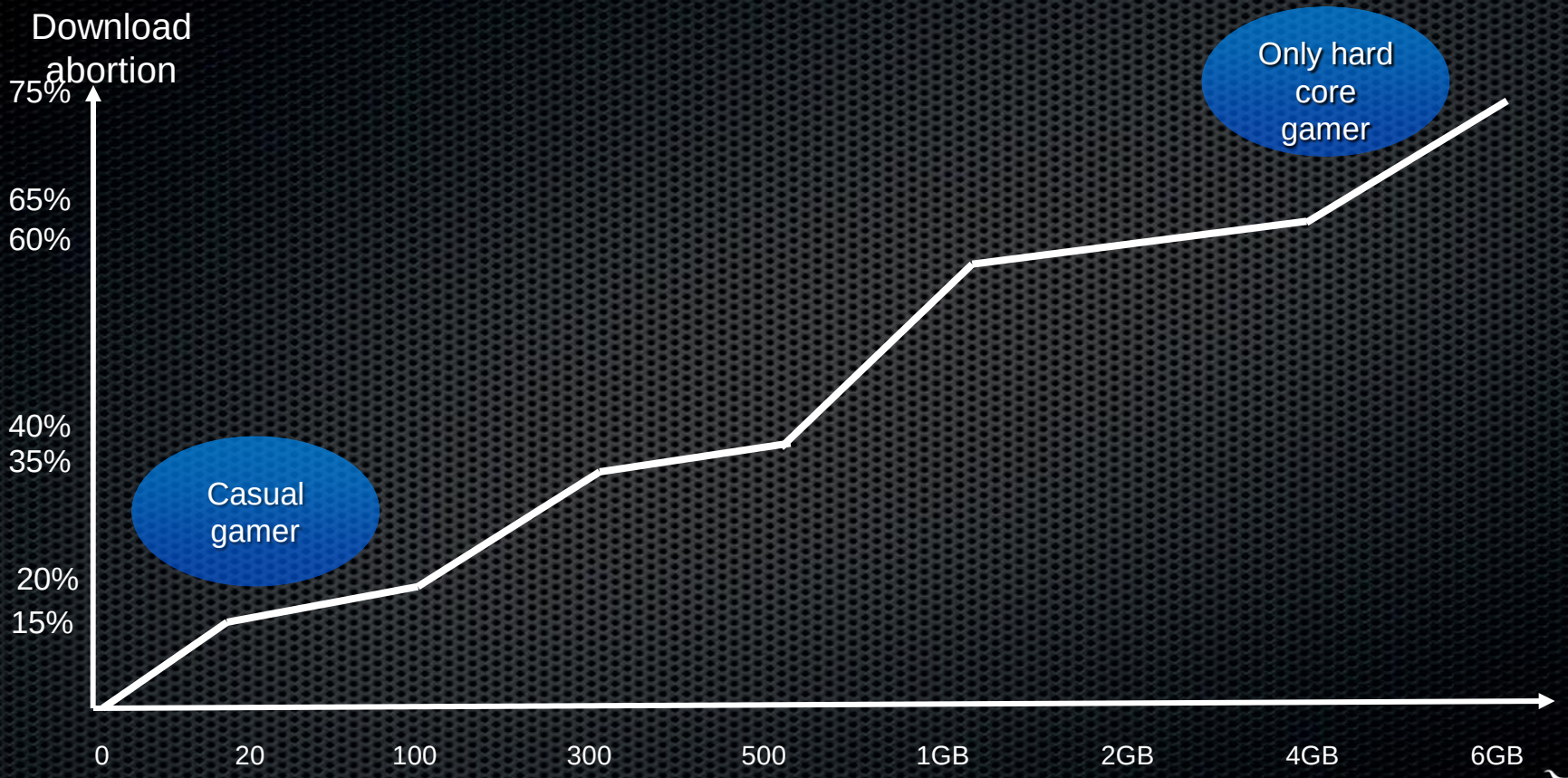
The Inconvenient Truth About 3D Games To Be Digitally Distributed

- Plausible client size for next gen smart phone 3D game : 100 MB
- Expected true end user 4G bandwidth: ~2Mb/s = 250 KB/s
- Time to download the game: ~ 7min = Showstopper for a majority of potential buyers
- …and 7 minutes of high battery consumption

Size Definitely Matters For Downloadable Games: No Surprise

- What's the point of doing a good looking 3D game if nobody can download it?
- Bandwidth might saturate rather quickly (remember #attfail)
- Download size is already a major concern in the PC MMO field
- …and waiting tolerance on cell phone is much lower than on a PC

The Importance Of Reducing The Downloadable Client Size



Source: representative sample of free to play game on the US/China market

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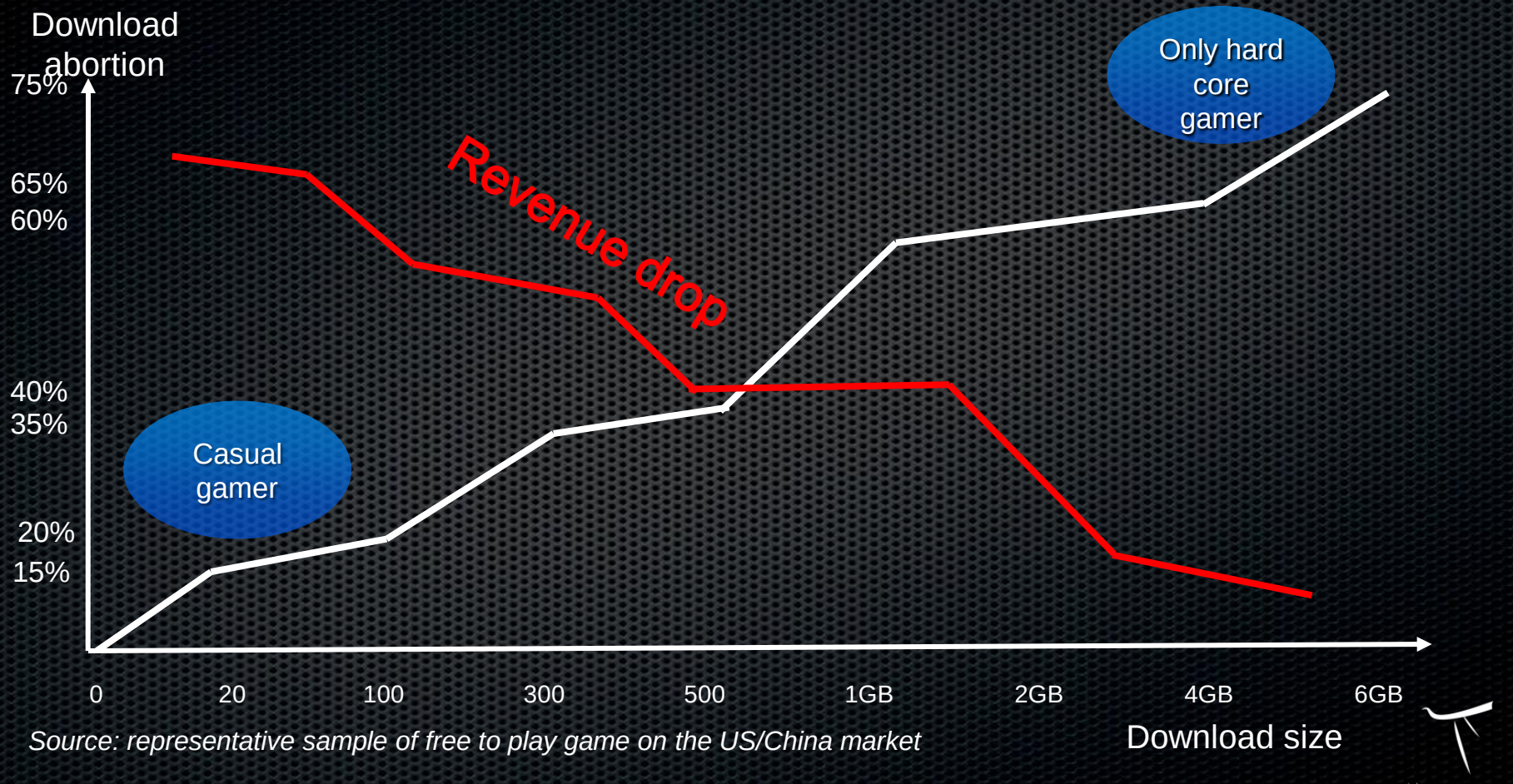

Source: representative sample of free to play game on the US/China market

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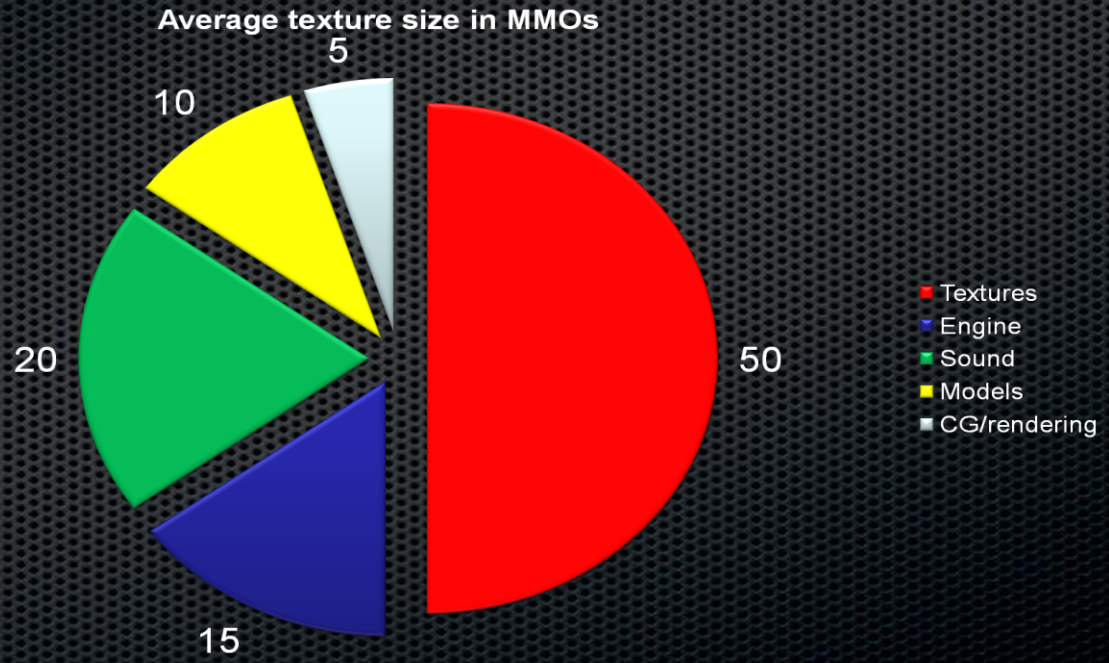
3D Games Size: Textures A Great Deal

- Today's visual standards for 3D games make them weigh Gigabytes…



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Introducing Substance: A New Data Type For Textures

- Substance produces substances
- Substances are “smart textures”:
  - Compact
  - Dynamic
  - Customizable

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The Windmill (demo from Austin GDC 09)

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The Windmill (demo from Austin GDC 09)

350 MB of textures that fits in 300 KB

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Namacius (demo from San Francisco GDC 08)

280 MB of textures that fits in 125 KB

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Distributing Substances

Handcrafted

create

content

display

emotion

Hybrid

define

description

compute

content

display

emotion

Produce

Store

Deliver

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Substance: 2K Textures in 2KB

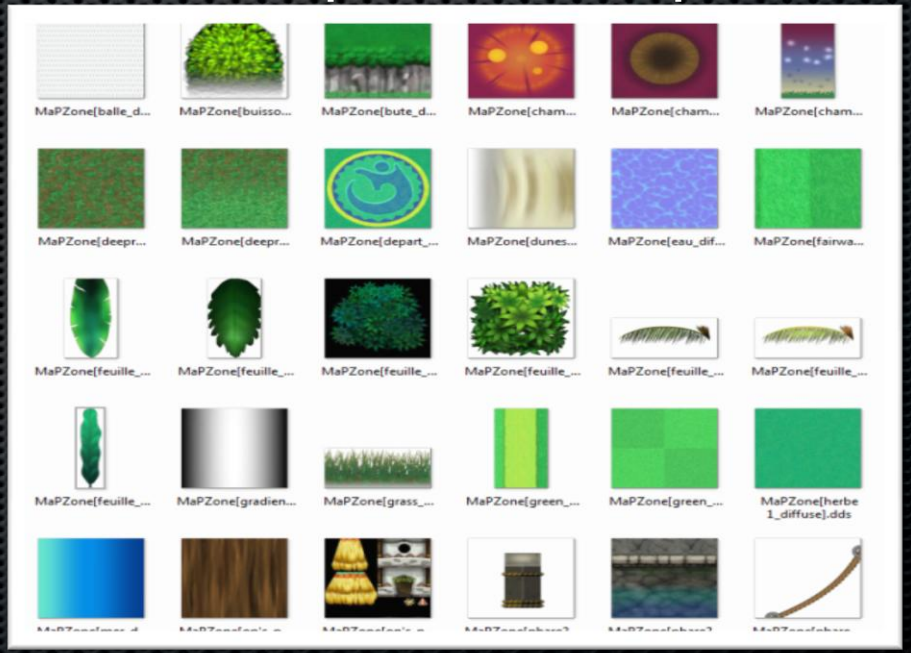
Substance Files are 500+ times smaller than traditional bitmaps

Substance textures

```
version 2.6.0;
memf _10a { memf1 morphlet_Scale; memo3 0.13; memo4 0.91; memo5 0.69; }
memf _13y { memf1 morphlet_Brik_Smooth_Max; memo5 0.52; memo6 real_rand1*0.04; }
memf _13z { memf1 morphlet_Brik_Max; memo5 0.52; memo6 real_rand1*0.04; }
memf _140 { memf1 morphlet_Square_Max; memo3 0.5; memo4 2; memo5 0.54; }
memf _141 { memf1 morphlet_Pyramid_Max; memo4 0.19; memo5 0.09; }
memf _142 { memf1 morphlet_Gaussian_L_uB; memo3 0.66; memo4 0.19; memo5 0.09; }
memf _143 { memf1 morphlet_Gaussian2; memo3 0.31; memo5 0.26; }
memf _14l { memf1 morphlet_Tri_Pyra; memo4 3.6; memo5 0.28; memo6 real_rand_bis0_1*0.31+-1.76; }
memf _161 { memf1 morphlet_Paraboloid_Max; memo3 1.22; memo4 real_rand1_2; memo5 real_rand1_2*0.5; me
memf _17i { memf1 morphlet_Brik_Smooth; memo3 1.19; memo4 0.48; memo5 1.73; memo6 real_rand0_1+-0.55;
memf _17j { memf1 morphlet_Brik_Max; memo3 0.85; memo4 0.44; memo5 2.96; memo6 real_nX_C*real_SIN2PIn
memf _18o { memf1 morphlet_Bell_S; memo3 real_rand1_2; memo4 0.11; memo5 6.21; memo6 real_rand0_2Pi;
memf _18p { memf1 morphlet_Gaussian; memo4 0.28; memo5 real_rand2_5*1.5; memo6 real_rand0_2Pi; }
memf _19 { memf1 morphlet_Bell_Ridge; memo3 1.32; memo4 1.01; memo5 1.49; memo6 real_nAngle*-1+1.57;
memf _1a { memf1 morphlet_Scale; memo3 0.89; memo4 1.2; memo5 1.02; }
memf _1a2 { memf1 morphlet_Brik_Smooth; memo4 0.35; memo5 2; memo6 real_nX*1.34+-0.97; }
memf _1a3 { memf1 morphlet_Square; memo3 0.44; memo4 1.17; memo5 0.9; }
memf _1a4 { memf1 morphlet_Square; memo3 0.14; }
memf _1a5 { memf1 morphlet_HalfSphere; memo3 0.29; }
memf _1a6 { memf1 morphlet_HalfSphere; memo3 -0.02; }
memf _1a7 { memf1 morphlet_Pyramid; memo3 -0.11; }
memf _1b { memf1 morphlet_Scale; memo4 1.12; memo6 real_nAngle*-1+3.14; }
memf _1b5 { memf1 morphlet_Pyramid; memo3 0.91; }
memf _1cn { memf1 morphlet_Gaussian_uB; memo3 1.36; memo4 real_COS2PInY*1.9+8; memo5 real_COS2PInX*0.
memf _1ct { memf1 morphlet_Pyramid_Max; memo3 3.78; memo6 -0.78; }
memf _1cu { memf1 morphlet_Scale; memo3 0.9; memo4 1.46; memo6 -1.56; }
memf _1f0 { memf1 morphlet_Gaussian_Copy; memo3 5; }
memf _1gl { memf1 morphlet_Hexa_Pyra; memo3 0.1; }
memf _1gm { memf1 morphlet_Brik; memo3 0.5; memo4 3; memo5 0.18; }
memf _1gn { memf1 morphlet_Bell_L; memo3 0.1; }
memf _1gq { memf1 morphlet_Gaussian_L_uB; memo3 1.5; }
```

= 35 KB

Hand painted / Bitmap



= 20 MB

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From 3D to AAA-looking 3D

3D Better I'll buy that

⇒ Mediocre 3D is worst than mediocre 2D

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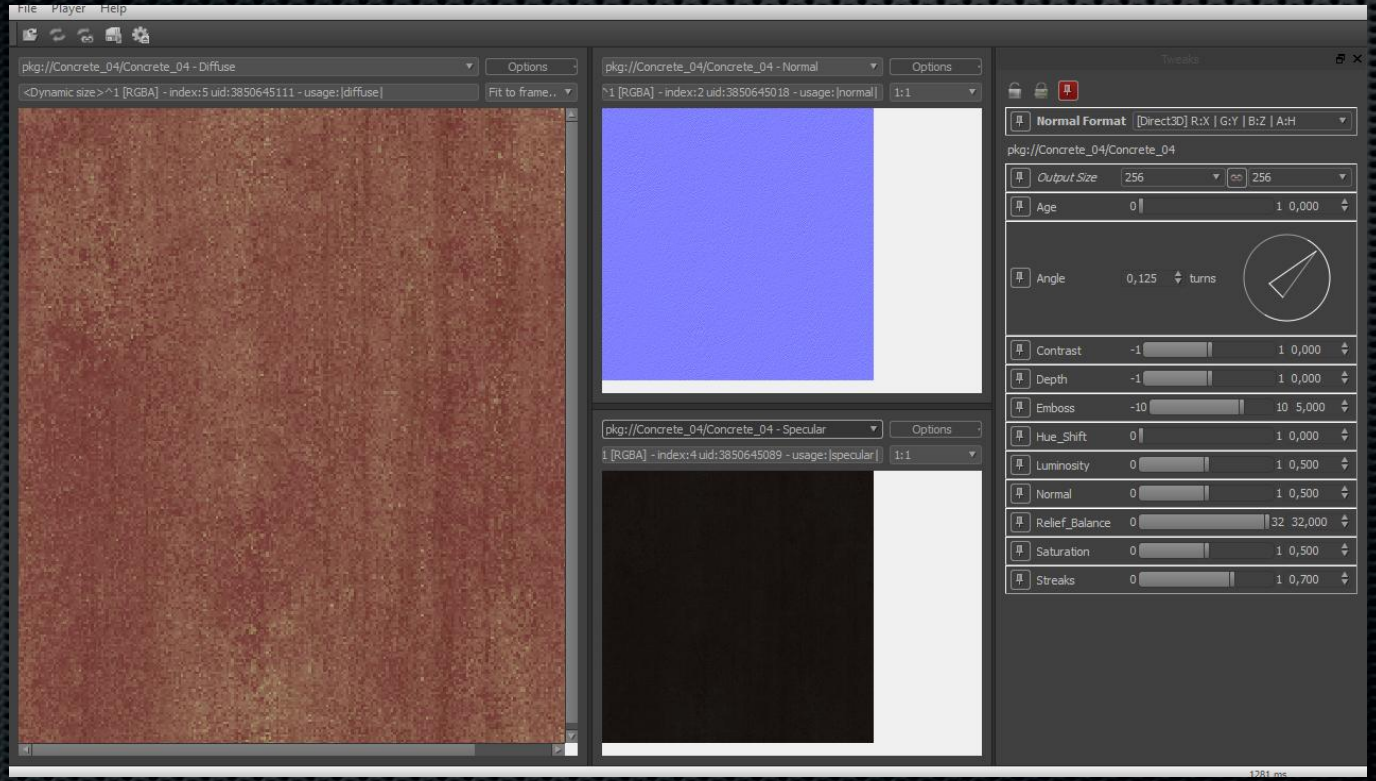
Substances: Dynamic, Customizable materials

Demo: Substance Player



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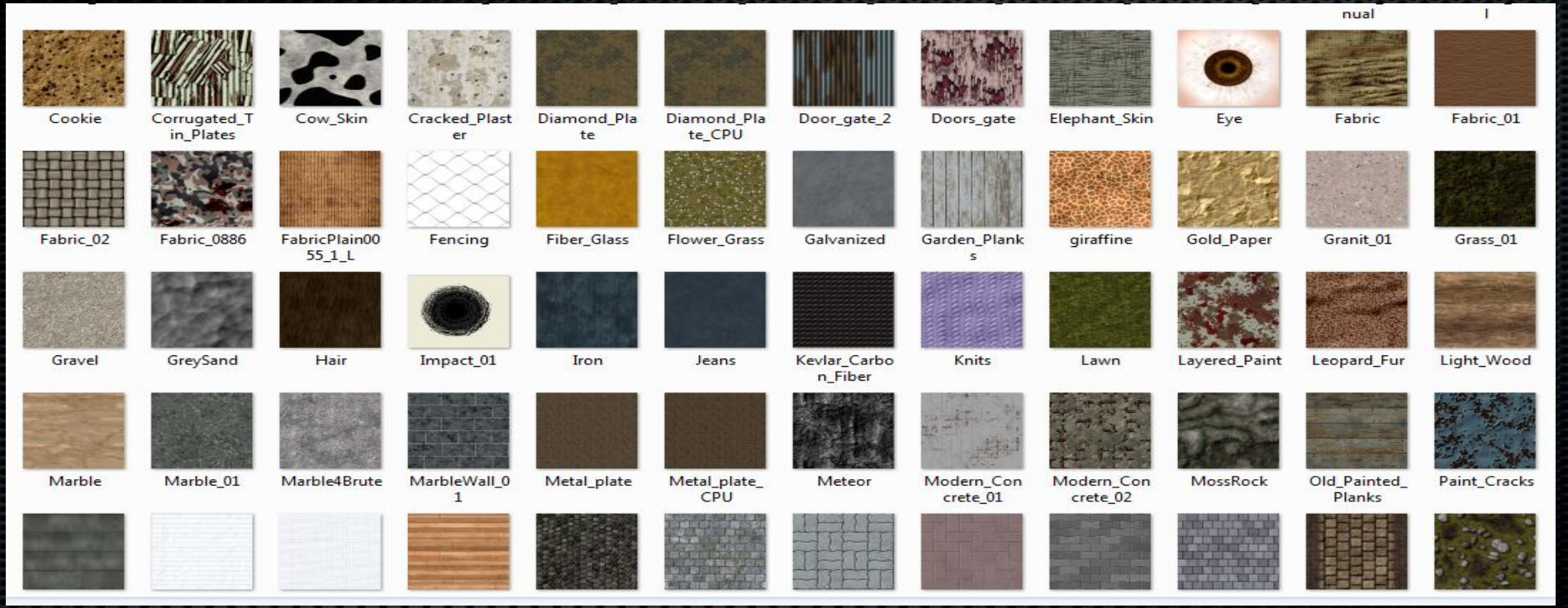
Thousands of Predefined, Customizable Substance Samples



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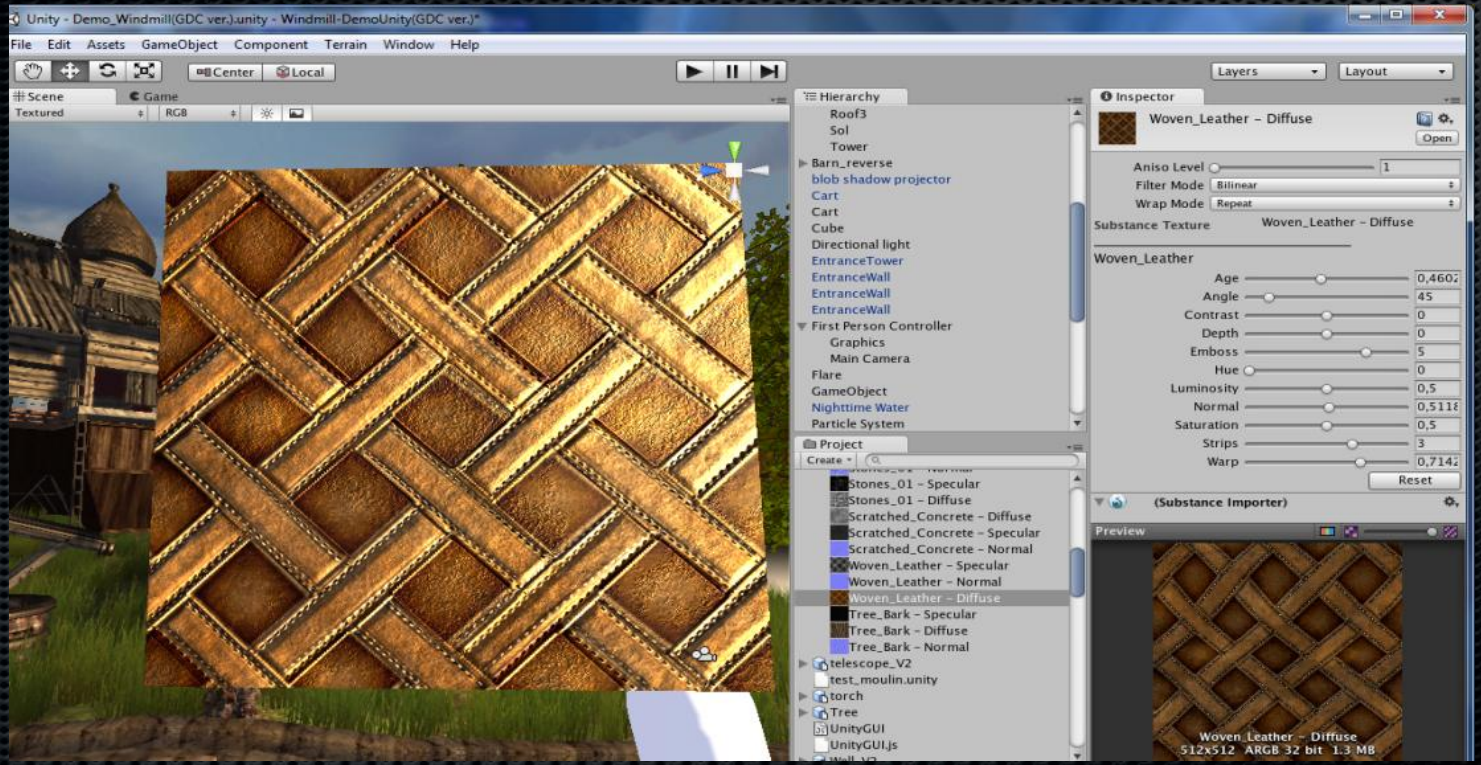
Customization of Substances For Quick Production

Demo: Integration in Unity 3D



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Dynamic, Customizable Substances

Demo: Substance For Tegra

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One step further: Creating your own Substances

Demo: Substance Designer

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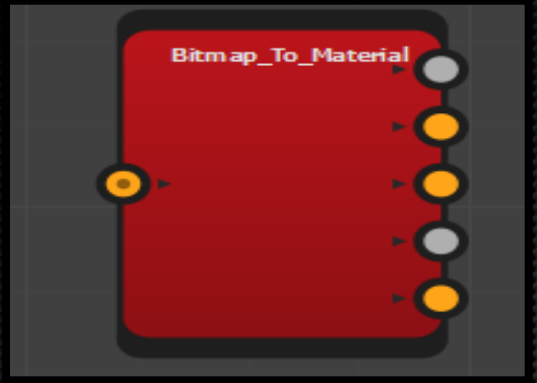
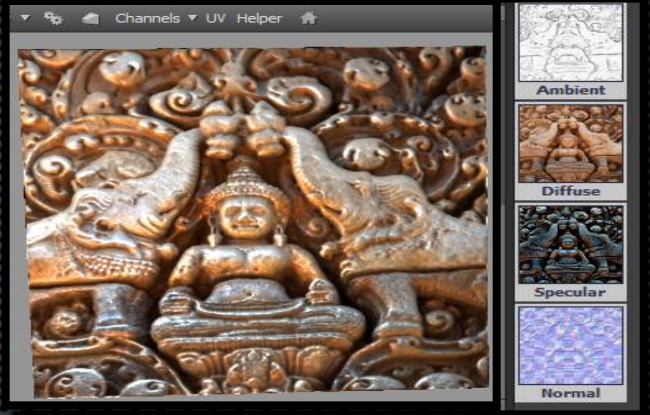
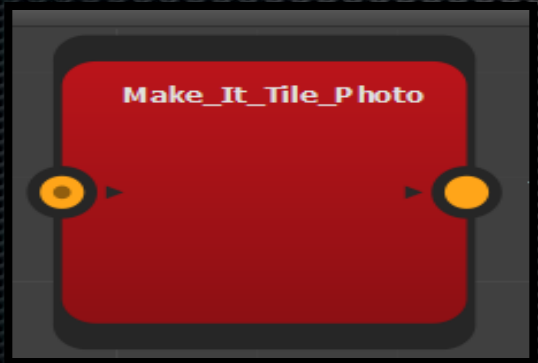
Substance Designer: Bitmap Transformation Tools

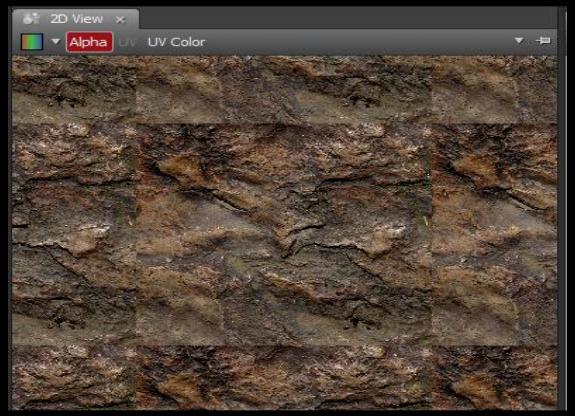
Before

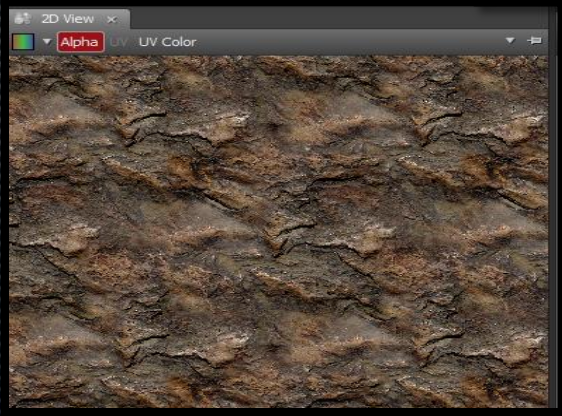
After











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Substance: 2K Textures in 2KB

- Hybrid approach
  - Bitmaps
  - Vector Graphics
  - Procedural Content
- Compact representation
- Fast generation of texture outputs:
  - Diffuse
  - Normal
  - Specular
  - Emissive
  - Etc.

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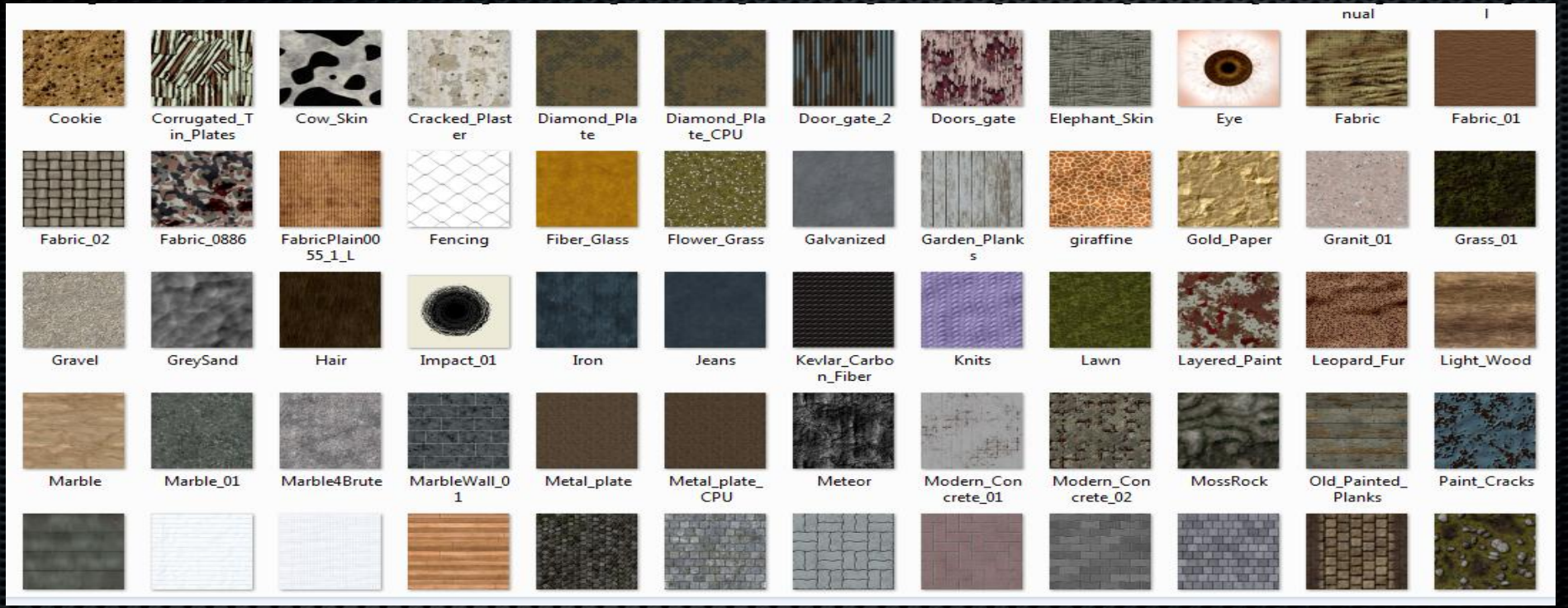
Thousands of Predefined, Customizable Substance Samples



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Substance: AAA-looking 3D Games on Tegra

- Compact: 2K textures in 2KB
- Dynamic: Ease of customization
- Content: library of thousands of predefined, complete samples

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Creating a standard for Tegra: interoperability and plugins

Substance Tegra available for:

Q3 2010

Q4 2010

Q4 2010

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Contact us

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2k textures in 2kb

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