

C++ Club Meeting Notes

Gleb Dolgich

2018-12-06

San Diego trip reports

- ▶ Botond Ballo
- ▶ JeanHeyd Meneide

CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (1/13)

Video

cppcon | 2018
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Scientific and Technical Academy Awards

INTRODUCTION

MARK ELENDT

Patterns and Techniques
Used in the Houdini
3D Graphics Application

SideFX

CppCon.org

CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (2/13)

The slide features a timeline at the bottom showing the years 1980, 1981, 1982, 1983, and 1984. Above the timeline, there are several horizontal bars representing different projects and technologies. A red vertical line marks the year 1982, with a red dot positioned above the timeline at approximately 1982.5. The bars include:

- HISTORICAL ROOTS**: Includes MAGI, ABEL, III, and DIGITAL EFFECTS.
- RETROSPECTIVE**: Features a small image of a car from the movie TRON.
- DIGITAL PROD.**
- OMNIBUS**
- PDI**
- CARSTON CSURI**
- POLYGON PICTURES**
- SideFX**

On the right side of the slide, there is a video frame showing Mark Elendt speaking at a podium. The podium has a laptop on it, and the name "MARK ELENDT" is displayed on a screen. Below the video frame, the text reads:

**Patterns and Techniques
Used in the Houdini
3D Graphics Application**

CppCon.org

At the top right of the slide, the CppCon 2018 logo is displayed: **cppcon | 2018** THE C++ CONFERENCE • BELLEVUE, WASHINGTON

CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (3/13)

The image is a composite of two parts. On the left is a screenshot of a presentation slide. The slide features a red background with five young men from the band New Kids on the Block. A small circular icon with a spiral symbol and the year '1982' is in the top-left corner. In the top-right corner, there's a white rectangular box containing the word 'INTRODUCTION'. The SideFX logo is in the bottom-right corner. On the right is a photograph of a man, Mark Elendt, standing and gesturing with his right hand. He is wearing a dark polo shirt with a small logo on the chest. Below the photo is a white box with the text 'MARK ELENDT'. At the bottom of the slide, there is another white box containing the title 'Patterns and Techniques Used in the Houdini 3D Graphics Application'. In the bottom-right corner of the entire composite image is a yellow box with the text 'CppCon.org'.

1982

INTRODUCTION

SideFX

MARK ELENDT

Patterns and Techniques
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Early Days

RETROSPECTIVE



MARK ELENDT

Patterns and Techniques
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3D Graphics Application

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CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (5/13)

The slide is titled "Retrospective" and shows a timeline from 1985 to 1989. It features two portraits: one of Greg Hermanovic (left) and one of Kim Davidson (right). Below the portraits are their names. A screenshot of the "PRISMS" software interface is shown, with a red dot on the timeline indicating its release year around 1988. The SideFX logo is visible at the bottom right of the software screenshot. The CppCon 2018 logo is in the top right corner.

Retrospective

1985 1986 1987 1988 1989

Greg Hermanovic Kim Davidson

PRISMS

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Patterns and Techniques
Used in the Houdini
3D Graphics Application

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CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (6/13)

The image is a composite of two photographs. On the left, a group of five young men, known as the boy band NSYNC, are posed together against a blue background. They are all smiling and dressed in casual 1990s-style clothing. The year '1997' is visible in the top left corner of this photo. On the right, a man named Mark Elendt is shown from the waist up, wearing a black polo shirt with a small logo on the chest. He is standing with his hands in his pockets, looking towards the camera with a slight smile. The CppCon 2018 logo is in the top right corner. Below the portraits, there is descriptive text.

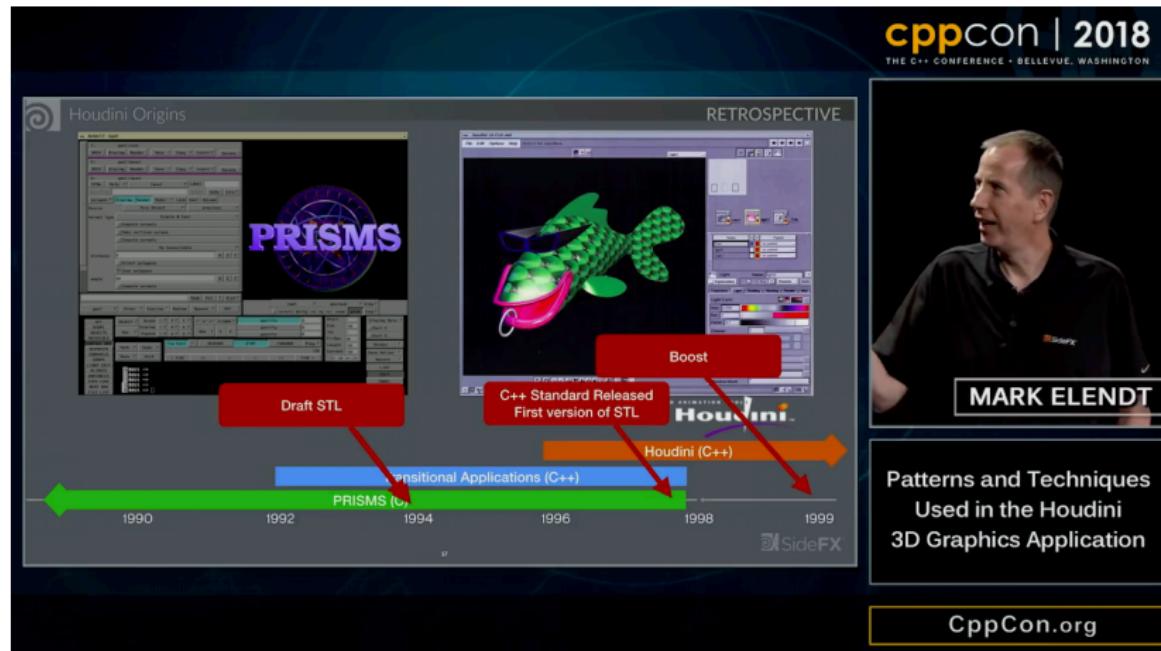
RETROSPECTIVE

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CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (8/13)

VFX Reference Platform

2015

- gcc v4.8.2
- boost 1.5.x
- Qt 4.8.x
- Python 2.7.x

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**Patterns and Techniques
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VFX Reference Platform

2016

- gcc v4.8.2 -> unchanged
- boost 1.5.x -> boost1.5.8
- Qt 4.8.x -> Qt 5.6.1
- Python 2.7.x -> Python 2.7.5
- **C++11**

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CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (10/13)

The image shows a screenshot of a video player interface. In the top right corner, the CppCon 2018 logo is visible, with the text "THE C++ CONFERENCE • BELLEVUE, WASHINGTON". The main content area features a dark background with a presentation slide. On the left side of the slide, there is a circular icon with a swirl pattern and the text "VFX Reference Platform". To the right of this, the text "SOFTWARE ECOSYSTEM" is displayed. In the center of the slide, the year "2018" is shown above a bulleted list of software dependencies:

- gcc v4.8.2 -> gcc v6.3.1
- boost 1.5.8 -> boost1.6.1
- Qt 5.6.1 -> unchanged
- Python 2.7.5 -> unchanged
- **C++11 -> C++14**

On the right side of the slide, there is a photograph of a man with short grey hair, wearing a black polo shirt with a small logo on the chest. He is gesturing with his hands while speaking. Below the photo, the name "MARK ELENDT" is displayed in a white box. At the bottom right of the slide, the SideFX logo is present. The overall theme of the slide is the "VFX Reference Platform Software Ecosystem" for the year 2018.

MARK ELENDT

Patterns and Techniques
Used in the Houdini
3D Graphics Application

CppCon.org

CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (11/13)

The slide is from the CppCon 2018 conference, specifically the session "Patterns and Techniques Used in the Houdini 3D Graphics Application" by Mark Elendt.

Code Editor Content:

```
template <typename T>
class UT_Array
{
    UT_Array() {}

    void growCapacity(size_t size) {
        if (_array)
            _array = (T *)realloc(_array, size*sizeof(T));
        else
            _array = (T *)malloc(size*sizeof(T));
        _size = size;
    }
}
```

Speaker: MARK ELENDT

Title Card:

Patterns and Techniques
Used in the Houdini
3D Graphics Application

Bottom Right: CppCon.org

CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (12/13)

Data Representation

HOUDINI GEOMETRY

```
Points = {  
    float3 P[4];  
    float3 Velocity[4];  
    float Temperature[4];  
};  
  
Triangles {  
    vector<point> Vertices[2];  
    string Shader[2];  
};
```

```
Points[] = {  
    P = {{0,0,0},{2,0,0},  
          {1,1,0},{-2,-9,0}},  
    Velocity = {{1,0,0},{1,0,0},  
                {1,0,0},{1,0,0}},  
    Temperature = {20,20,  
                  20,20},  
};  
Faces[] = {  
    Vertices = {{0,2,3},{0,1,2}},  
    Shader = {"green","green"},  
}
```

SideFX

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CppCon 2018: Mark Elendt “Patterns and Techniques Used in the Houdini 3D Graphics Application” (13/13)

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Data Representation HOUDINI GEOMETRY

```
template <typename POD_T>
class UT_PageArray {
    class PageData {
        POD_T * _data;
    };

    PageData *_pages;

    POD_T &operator[](size_t i) {
        size_t page, offset;
        splitIndex(i, page, offset);
        return _pages[page][offset];
    }

    inline void splitIndex(size_t i, size_t &page, size_t &offset)
    {
        page = i >> PAGE_BITS;
        offset = i & PAGE_MASK;
    }
};
```

SideFX

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Package management is hard, let's mine some Bitcoin (1/2)

 **Kenn White**
@kennwhite

Holy hell, Node. A package with 2 million downloads a week and the maintainer hands over control to a rando stranger? And now it's mining cryptocurrency. Wow.

[github.com/dominictarr/ev...](https://github.com/dominictarr/event-stream)
pic.twitter.com/MkqhHzjc1

dominictarr commented 5 days ago

he emailed me and said he wanted to maintain the module, so I gave it to him. I don't get any thing from maintaining this module, and I don't even use it anymore, and haven't for years.

Owner

41 49 16 3 11 31

 **dominictarr** commented 5 days ago

note: I no longer have publish rights to this module on npm.

Owner

13 11 18 1 1

1,161 Likes	952 Retweets
26 Nov 2018 at 19:10	via Twitter Web Client

 **Jackson Palmer**
@ummjackson

Yikes. The [@BitPay](#) Copay wallet was/is vulnerable to keys being stolen due to the "event-stream" [@npmjs](#) module containing malware because [@dominictarr](#) handed over maintenance of the module to a random person who emailed him. Millions of other NPM module users also affected. 😱

Kevin Beaumont 😬 @GossiTheDog 20h
NPM library with 2m installs has a backdoor, looks to be some kind of Trojan (stealer?) [github.com/dominictarr/ev...](https://github.com/dominictarr/event-stream)

235 Likes	128 Retweets
26 Nov 2018 at 19:02	via Twitter Web Client

Package management is hard, let's mine some Bitcoin (2/2)

- ▶ Issue on GitHub “I don’t know what to say”
- ▶ Details on the npm blog
- ▶ event-stream vulnerability explained
- ▶ Bleeping Computer
- ▶ Exploiting developer infrastructure is insanely easy
- ▶ The Node.js Ecosystem Is Chaotic and Insecure

Who is STL? I mean the person, not the library

Reddit

Hey. I'm Stephan T. Lavavej ("Steh-fin Lah-wah-wade"), and I've worked on MSVC's STL since 2007. I've also worked on several Standard proposals that were accepted (notably the transparent operator functors). I filmed a bunch of videos for MS's Channel 9 years ago, introducing various Core Language and Standard Library topics, and I've given talks at C++Now (formerly BoostCon) and CppCon which have been recorded.

Real world problems with #pragma once?

Reddit

No.

Corentin Jabot:

Pragma once leads to UB if part of the sources are visible from several included paths which are hardlink of each others.

Good. If you do that, you deserve to suffer!

Pointer-to-member-functions can be tricky

- ▶ Post
- ▶ Snippet
- ▶ Raymond Chen: Pointers to member functions are very strange animals

Prepare thy Pitchforks: A De-facto Standard Project Layout

- ▶ Early Reddit post
- ▶ Later Reddit post
- ▶ Blog post
- ▶ GitHub repo

Reimplementing NumPy in C++

- ▶ NumCpp
- ▶ xtensor

Other linear algebra libraries

- ▶ Blaze
- ▶ Eigen
 - ▶ the official repo
 - ▶ docs

Visual C++ Team Blog - std::any: How, when, and why

Post

When you need to store an object of an arbitrary type, pull std::any out of your toolbox. Be aware that there are probably more appropriate tools available when you do know something about the type to be stored.

C++ Best Practices, by Jason Turner

[GitHub](#)

Quote

Andrey Mokhov (@andreymokhov) via Twitter:

Inside every large program there is a small build system struggling to get out.