Adventures in Data Compilation

Uncharted: Drake's Fortune

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Game Developers Conference, 2008

Motivation

- Code is compiled, data is “built”
- What should be code, what should be data? Plenty, right?
  - Game logic, geometry, textures...
- What is not clearly either?
  - Particle definitions, animation states & blend trees, event & gameplay scripting/tuning, more...

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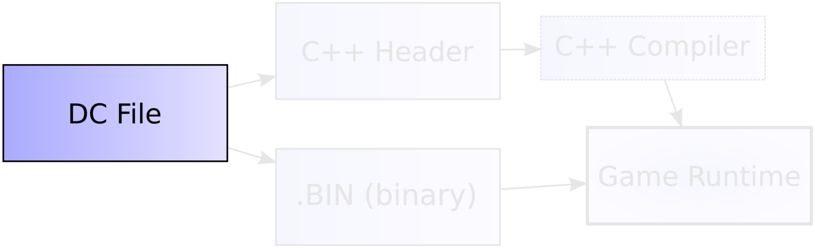
Architecture



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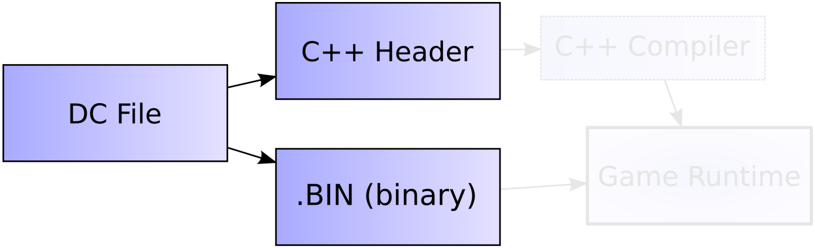

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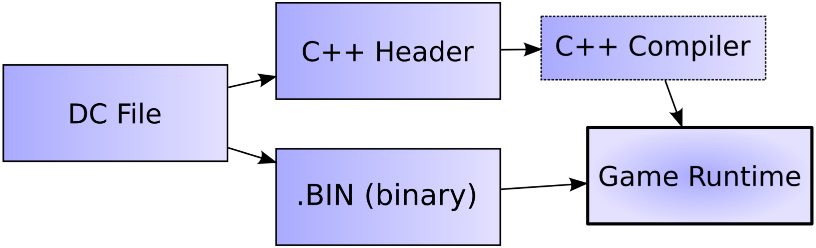

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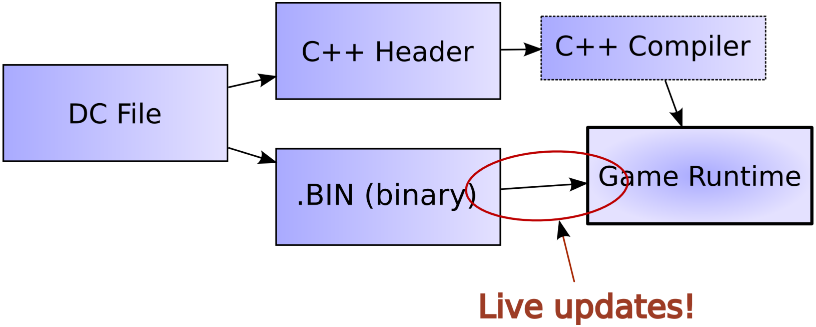

Example

Let’s define a player start position:

```
(define-export *player-start*
 (new locator
      :trans *origin*
      :rot (axis-angle->quaternion *y-axis* 45)
      ))
```

Start with some types

```
(deftype vec4 (:align 16)
  ((x float)
   (y float)
   (z float)
   (w float :default 0)
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```
struct Vec4
{
  float m_x;
  float m_y;
  float m_z;
  float m_w;
};
```

Types continued

```
(deftype quaternion (:parent vec4)
 ())

(deftype point (:parent vec4)
 ((w float :default 1)
  ))
```

```
(deftype locator ()
 ((trans point :inline #t)
  (rot quaternion :inline #t)
  )
 )
```

Types continued

```
(deftype quaternion (:parent vec4)
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(deftype point (:parent vec4)
 ((w float :default 1)
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(deftype locator ()
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Types continued

```
(deftype quaternion (:parent vec4)
 ())

(deftype point (:parent vec4)
 ((w float :default 1)
  ))
```

```
struct Locator
{
  Point m_trans;
  Quaternion m_rot;
};
```

Define a function

```
(define (axis-angle->quat axis angle)
 (let ((sin-angle/2 (sin (* 0.5 angle))))
  (new quaternion
       :x (* (-> axis x) sin-angle/2)
       :y (* (-> axis y) sin-angle/2)
       :z (* (-> axis z) sin-angle/2)
       :w (cos (* 0.5 angle))
       )))
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       :w (cos (* 0.5 angle))
       )))
```

Define some instances

```
(define *y-axis* (new vec4 :x 0 :y 1 :z 0))
(define *origin* (new point :x 0 :y 0 :z 0))
```

```
(define-export *player-start*
 (new locator
      :trans *origin*
      :rot (axis-angle->quaternion *y-axis* 45)
      ))
```

Define some instances

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(define *y-axis* (new vec4 :x 0 :y 1 :z 0))
(define *origin* (new point :x 0 :y 0 :z 0))
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```
(define-export *player-start*
 (new locator
      :trans *origin*
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      ))
```

How we use these definitions in C++ code

```
...
#include "dc-types.h"
...
const Locator * pLoc =
  DcLookupSymbol("*player-start*");
Point pos = pLoc->m_trans;
...
```

Build upon this basis

We build upon this basis to create many many things

- Particle definitions
- Animation states
- Gameplay scripts
- Scripted in-game cinematics
- Weapons tuning
- Sound and voice setup
- Overall game sequencing and control
- ...and more