

**Just because you put your data in a
struct doesn't mean your data is
structured**

The background features a large, faded logo for 'INSOMNIAC GAMES'. The word 'INSOMNIAC' is in a stylized, rounded font, with the letter 'O' replaced by a detailed image of a full moon. Below 'INSOMNIAC', the word 'GAMES' is written in a smaller, simpler font. A registered trademark symbol (®) is located at the top right of the 'INSOMNIAC' text.

Structured Data vs. Bag O' Data

Common pitfalls and easy tips.

The background features a large, light gray watermark of the Insomniac Games logo. The logo consists of the word "INSOMNIAC" in a stylized, rounded font, with a blue and white planet or moon graphic integrated into the letter "O". Below "INSOMNIAC" is the word "GAMES" in a simpler, sans-serif font.

Don't mix context information with data to be transformed.

These are two *unrelated* sets of data.

```

31 class InternalGridAttribute : public BaseInternalAttribute
32 {
33 public:
34     //-----
35     // Data
36
37     bool    m_Visible;
38
39     bool    m_Enabled;
40
41     //
42     // API
43
44     inline uint32_t GetGridSizeSetting( void ) const;
45     uint32_t        uint32_t Luna::InternalGridAttribute::GetGridSizeSetting(void) const
46

```

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Example 1: How does the above relate to the below?

```

59     // Internal Data
60 protected:
61
62     uint32_t m_GridSizeSetting;
63     Grid     m_LocalGrid;    //!< Draw the major and minor line grids
64
65     static const InternalAttributeFieldInfo m_AttributeFields[];
66 };
67

```



Example 2: Mixing state machine state and transformed data


```

40 {
41     public:
42     enum ModifiedState
43     {
44         kUnmodified,
45         kModified,
46         kModified_NeedResolve,
47         kModified_NeedDDLUpdate,
48     },
49
50     Handle                m_Handle;
51
52     DDLInstance::MemoryCB* m_InstanceMemoryCB; // Pointer to the DDL instance
53     DDLInstance::Instance* m_Instance;        // Pointer to the DDL instance
54     AttributeDef::Index    m_DefIndex;
55
56     AttributeDB*          m_DB;
57
58     inline bool IsInternalAttribute( void );
59
60     inline ModifiedState GetModifiedState( void );
61
62     //-----
63     // Internal Stuff
64     protected:
65
66     ModifiedState          m_ModifiedState;
67
68     BaseInternalAttribute* m_InternalData;
69
70     friend class BaseAttributeAccess;
71
72     friend class AttributeDB;
73     inline Attribute* FreeListGetNext( void ) const;
74     inline void        FreeListSetNext( Attribute* next );

```

Example 3: Public, protected, private data



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**There's no such thing as
“optional” data.**

“Optional” is context information.
Separate that data.



Don't mix data with different lifespans.

“Lifespan
You'll spend
checking to see

Example:
Update classes.
Build-time data versus
runtime data.



For each vs. For all

“For each” considered harmful.

What if branching was one of the most expensive things you could do on the CPU? ...oh, wait.



Easy Step #1: SOA

SOA by default.

Combine as *appropriate*.

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Easy Step #1: SOA

Combine based on use:

e.g. xyzw

iate.

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Easy Step #1: SOA

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What about conflicting combinations?

This problem *already* exists.



Easy Step #1: SOA

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Wh

Can solve for cache coherency.

~2B PPU cycles/sec wasted on
waiting for memory.

This p

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And, of course...
Concurrency.

Separating data by context makes it
much simpler to solve for data
concurrency.



Real-life example:

David Thall