

C++ now

Building Consensus:

Rules for Our Massive C++ Codebase

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Bloomberg

Engineering

Building Consensus: Agreeing on Rules for our Massive C++ Codebase

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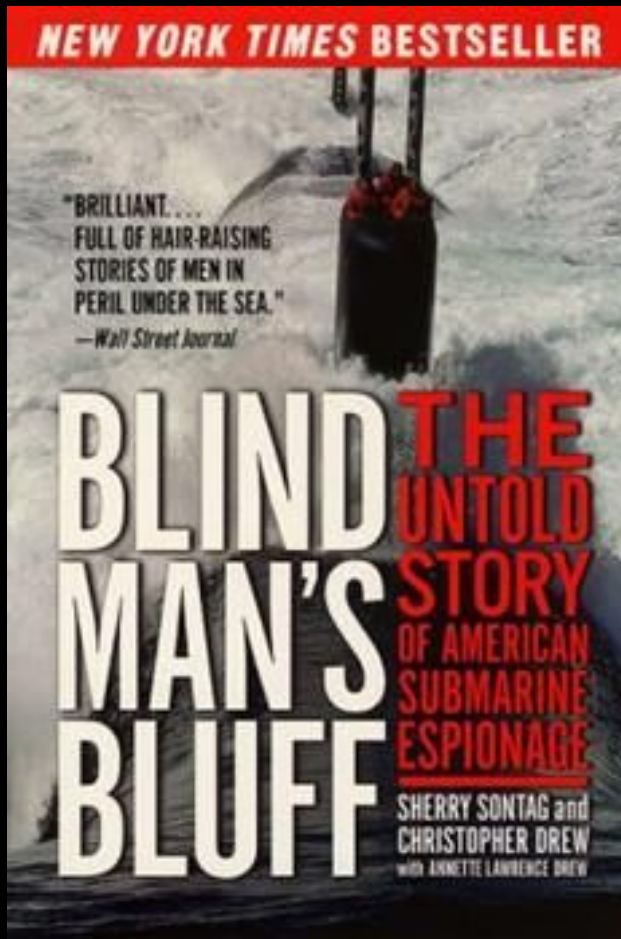


Who are we?

- We operate like hundreds of startups under one umbrella
- Publishing 40K+ C++ projects
- With hundreds of millions of lines of C++ source code

Who am I?

- Sherry Sontag, Co-author of “Blind Man’s Bluff”



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**Some of you might recognize the book as
the primary source for the ‘Gone Quiet’
episode of “The West Wing”**

I was invited to join Bloomberg Engineering by a manager who believed that anyone who could convince submariners to talk about classified information could also talk through code check-in with C++ programmers.

My colleagues taught me the C++ part. After 17 years, I am still motivated by their empathy.

An Opportunity to Come Together...

Our common build system has attracted 80 percent of our C++ code base

- This success came from keeping the barrier to entry low and vastly improved tools
- With so many of us in one place, we could start to consider standards and rules to strengthen our code base

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Be Open

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Be Generous

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Be Humble

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And most important:

Ask questions!

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A Dive into the Deep End: Targeting how we name C++ code

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...with a Shared Build System

- We had an opportunity to expand enforcement of our published standards for naming code
- Our aims then and now:
 - Code should be unique
 - Provide at-a-glance metadata
 - Support reusable, shareable components
 - Offer automated and consistent enforcement

How?

- We needed to get the broadest possible buy-in
- We had to be willing to ask the question, “do people want to throw all our past efforts away?”

What came before:

- Lakosian Package Groups: branded with three letter mnemonics
- Single packages with names clearly defining contents

Developers Were Immediately United by One Idea:

If there must be rules:

Make them easy to find and follow

And, as a Close Second...

People want to be consulted

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We Quickly Discovered...

This was going to be a process of enhancement, not erasure

We decided to craft a series of iterative proposals

- Research
- Publish
- Encourage debate



Three Requests for Comment

- **Nested Namespaces and namespace registration**
- **Mapping a single namespace to all published code**
- **How should namespaces be spelled**

Our Proposals Were Sailing Through

Developers saw registration as an early warning system

Consistency across published code and artifacts made senses

They appreciated the clarity of our existing standards and welcomed the flexibility of nested namespaces

It All Seemed Too Easy!

And it was...

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What Went Wrong?

We had overestimated our outreach

We missed whole teams who had their own independent histories and coding styles

Learning What We Didn't Know

- The technical lesson was simple: Some groups used sub-namespaces to organize their code
- Much harder was convincing developers we were actually listening

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So, Where Did We Land?

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Our Standards

- Parent Namespaces registered as branding
 - Can only hold other namespaces
- Package Leaf Namespaces
 - Used to publish packages and library code
 - Maps to everything published
- Sub-Namespaces within Package Leaf Namespaces
 - Used to organize code used within a **primary package leaf namespace**

To pull it all together

We created tools to implement new checks and grandfather existing code

We invited one last round of debate as we introduced our formal policy doc

Consensus was never 100% agreement – but developers were willing to go along with their colleagues

What's Next?

- **Tools to automate namespace creation and update older code**
- Enlist 'first responders,' give our people a chance to suggest what standards would help them

The skills turn out to be very much like good Journalism

- Be Open!
 - Believe that people want to do the right thing
- Be Humble!
 - Don't believe you always know what the right thing is
- Be Generous!
 - Find and include the people most likely to avoid you

Thank you!

<https://www.TechAtBloomberg.com/cplusplus>

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Example

This:

```
::Bloomberg::tickettradesadvocacyserVICetypes
```

Can instead be universally readable:

```
::Bloomberg::ticket::trades::advocacy::service::types
```


Example

Namespace: `Bloomberg::transittools::subway`

Package Name: `libtransittools-subway-dev`

Library Archive / Shared Object Name: `transittools-subway.a/so`

Header Name Pattern: `transittools/subway/*.h`

Example: `transittools/subway/express.h`

Example

<u>Package</u>	<u>Namespace</u>	<u>Type</u>
libtransitsvc-dev	::Bloomberg::transitsvc	Package Leaf
libtransitsvc-dev	::Bloomberg::transitsvc::subway	Sub-Namespace within Package Leaf
<i>*no package*</i>	::Bloomberg::aviation	Branding
libaviationsvc-aircraft-dev	::Bloomberg::aviation::aircraft	Package Leaf
libaviationsvc-aircraft-dev	::Bloomberg::aviation::aircraft::phalange	Sub-Namespace within Package Leaf