Doc No: SC22/WG21/N1759
J16/05-0019
Date: Oct 5, 2004
Project: JTC1.22.32
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TG5 Liaison Report #6

Meeting #7 of Ecma TC39/TG5 (C++/CLI) was held in Redmond, WA, USA, on September 20–21, 2004.

The following TG5 documents are attached to this liaison report:

- TC39-TG5/2004/34 **Intentionally omitted (see below)**
- TC39-TG5/2004/35 Agenda for the 7th meeting of Ecma TC39 TG5, Redmond, Washington, USA, 20–21 September 2004
- TC39-TG5/2004/36 C++/CLI Specification comments - revision 14 September 2004
- TC39-TG5/2004/37 Project Editor's report September 2004
- TC39-TG5/2004/38 TG5 Convener's Report to TC39, September 2004C
- TC39-TG5/2004/39 C++/CLI Specification comments - revision 27 September 2004
- TC39-TG5/2004/40 Minutes of the 7th meeting of TC39-TG5, Redmond, WA, September 2004

Document TC39-TG5/2004/34, "Working Draft 1.7 of the C++/CLI Standard, Language" is not included. This draft can be found at the following URLs:

- http://www.plumhall.com/ecma/index.html
- http://msdn.microsoft.com/visualc/homepageheadlines/ecma/default.aspx
- http://www.dinkumware.com

This is a replacement/place-holder for Document TC39-TG5/2004/34, “Working Draft 1.7 of the C++/CLI Standard, Language”. This draft can be found at the following URLs:

- http://www.plumhall.com/ecma/index.html
- http://msdn.microsoft.com/visualc/homepageheadlines/ecma/default.aspx
- http://www.dinkumware.com

Agenda for the: 7th meeting of Ecma TC39-TG5

to be held in: Redmond, WA, USA

on: 20-21 September 2004

TIME: **09:00 till 17:00 on Mon 20th September 2004**
09:00 till 17:00 on Tue 21st September 2004
[8:30 AM Breakfast, Noon lunch each day]

LOCATION: **Mon 20th September: Bldg 43, Room 1207**
Tue 21st September: Bldg 41, Room 2585
Microsoft Campus, Redmond WA 98052 USA
(Directions: see TG5/2004/021)

CONTACT: **John Hawkins**
johawk@microsoft.com

1 Opening

- **1.1 Appointment of Recording Secretary**
- **1.2 Introduction of participants**
- **1.3 Host facilities/local information**

2 Adoption of the agenda

3 Final approval of minutes of previous TG5 meeting (2004TG5-029 and -032)

4 Matters arising from the minutes not covered elsewhere

5 Project Editor's Report

6 Approving tracked changes in latest draft

7 Date and place of next meetings

- **7.1 October 22(pm)-23, Redmond, WA; hosted by Microsoft**
- **7.2? November/December, Westfield, NJ; hosted by EDG/Dinkumware**
- **7.3? January 26-28, Redmond, WA; hosted by Microsoft**
- **7.4 March 8-9, Kona, HI; hosted by Plum Hall**

NOTE

TG5 business meeting takes place March 11(pm)

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
10	4-Dec-03	meeting #1 (TX)	14	Technical	M	Brandon Bray	pull together all the conversion information into one place. Make sure all conversions are covered.		No	
11	4-Dec-03	meeting #1 (TX)	15.3.2	Technical		Steve Adamczyk	comma vs. semicolon as separator in indexed access expressions In indexed access expressions (§15.3.2), comma operators are currently disallowed inside [ ] unless they are enclosed in parentheses. This conflicts with usage in existing template libraries (e.g., Lambda), in which the comma operator occurs inside [ ] without enclosing it in parentheses.	Meeting #2 (HI): Can we treat commas in [ ] not having enclosing parenthesis, in any context, always be treated as punctuators? Yes. Steve will provide words to the editor for this. Meeting #3 (Mel): Steve produced a paper. He reported one outstanding issue: In 15.3.2, "Indexed Access", in the C++/CLI spec is rather vague. There, we have indexed-access: indexed-designator [expression-list] where indexed-access is defined as an additional alternative for postfix-expression: postfix-expression: indexed-access Unfortunately, there isn't any definition of indexed-designator, so I'm not quite sure whether all the multi-dimensional cases are supposed be handled by indexed-designator, leaving the traditional cases to be handled by the original (possibly modified) syntax. An alternative would be not to introduce indexed-access at all, and use the definition postfix-expression: postfix-expression [expression-list] to handle all the cases, for both traditional subscripting and the new C++/CLI indexer references. There was agreement to this, so Steve will update his p	No	
13	4-Dec-03	meeting #1 (TX)	12	Technical	M	Brandon Bray	Add a diagram of the type tree		No	
19	5-Dec-03	meeting #1 (TX)		Technical	L	Brandon Bray	list of overlap between Standard C++ and features proposed by C++/CLI		No	
23	16-Dec-03	Phone meeting	8.2.3	Editorial	H	Brandon Bray	Say more, especially w.r.t the template class array<element-type>.		No	
24	16-Dec-03	Phone meeting	9	Technical	R	Brandon Bray	Review this clause.		No	
25	16-Dec-03	Phone meeting	10	Technical	H	Brandon Bray	Revise this clause by covering topics including application entry point, assembly boundaries, among others.		No	
27	16-Dec-03	Phone meeting	12.13.6	Technical	H	Brandon Bray	Describe how interior_ptr, pin_ptr, array, and safe_cast are template-like with certain constraints.		No	
28	16-Dec-03	Phone meeting	12.3.6	Technical	M	Brandon Bray	Describe how the compiler will need to emit a modopt to distinguish interior_ptr<T> from tracking reference to T (T%) in the metatada.		No	
29	16-Dec-03	Phone meeting	12.3.6.2	Technical	M	Brandon Bray	Spell out target type restrictions		No	
32	16-Dec-03	Phone meeting	13	Technical		Tom Plum	What, if anything, goes in this clause?		No	
33	16-Dec-03	Phone meeting	14.1.1	Editorial	R	Brandon Bray	Review this subclause.		No	
34	16-Dec-03	Phone meeting	14.4	Editorial	R	Brandon Bray	Review this subclause.		No	
35	16-Dec-03	Phone meeting	15.1	Technical	H	Brandon Bray	The rewrite rules for e[x] (default indexed accesses) are different where there is only one index. This is because there is a potential ambiguity with the C++ operator[]. Is this mentioned elsewhere?		No	
36	16-Dec-03	Phone meeting	15.3.8	Technical	M	Brandon Bray	cv-qualification needs to be considered.		No	
38	16-Dec-03	Phone meeting	15.3.9	Technical	L	Brandon Bray	Provide a spec for standard typeid (that returns std::type_info) in addition to the new typeid (that returns System::Type).		No	

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39	16-Dec-03	Phone meeting	15.3.13	Editorial	H	Brandon Bray	Update this subclause		No	
40	16-Dec-03	Phone meeting	15.4.1.1	Editorial	R	Brandon Bray	Review this subclause.		No	
43	16-Dec-03	Phone meeting	15.11.1	Technical		Mark Hall	Add support for handle equality comparison, and handle ==/!= nullptr, and vice versa.	Meeting #3 (Mel): Had a short discussion. Mark will produce a paper for the May meeting. Meeting #4 (NJ): No progress. To be discussed via email, and at the Jun meeting Meeting #5 (WA): Discussed briefly. Asked Mark to write this up and distribute to the reflector. Phone call Jun 29: This issue was resolved; just needs drafting of final words. Meeting 7 (WA): In the case of if(handle), which conversions are attempted before comparison against nullptr is used? We agreed that if an explicit conversion to bool exists, if(handle) uses that. There is no implicit unboxing. Steve and Mark worked on this and presented it to the full committee on the 2nd day. Based on committee feedback, Mark will write this up for future consideration.	No	
44	16-Dec-03	Phone meeting	15.18	Technical	H	Brandon Bray	Add words to discuss assignment for properties and events from the point of view of the rewrite rules.		No	
47	16-Dec-03	Phone meeting	17	Technical	M	Brandon Bray	Provide text for this clause		No	
50	16-Dec-03	Phone meeting	18.4	Technical	M	Brandon Bray	Extend declarator-id's by adding a new production that allows default.		No	
52	16-Dec-03	Phone meeting	18.4.2	Technical	H	Brandon Bray	This subclause only covers how the accessor functions must be defined. The expressions clause needs to cover the rewrite rules that call accessor functions.		No	
54	16-Dec-03	Phone meeting	18.5.2	Editorial	R	Brandon Bray	Review this subclause.		No	
55	16-Dec-03	Phone meeting	18.6	Editorial	R	Brandon Bray	Review this subclause.		No	
56	16-Dec-03	Phone meeting	18.6.4	Technical	M	Brandon Bray	Identify when synthesis would and would not occur.		No	
57	16-Dec-03	Phone meeting	18.6.5.1	Technical	L	Brandon Bray	Writeup op_true and op_false operators		No	
58	16-Dec-03	Phone meeting	18.6.6.1	Technical		Mark Hall	Reword this subclause similarly to the way special member functions are described.	Meeting 7 (WA): ?? To be done in Tue morning work sessions.	No	
59	16-Dec-03	Phone meeting	18.6.6.1	Technical	H	Brandon Bray	Add another subclause to cover the compiler-generated conversion from handle to unspecified bool type.	Meeting 7 (WA): ?? To be done in Tue morning work sessions.	No	
62	16-Dec-03	Phone meeting	18.10.1	Technical	L	Brandon Bray	Add a description that for any value class we have to make the copy before calling member functions.		No	
63	16-Dec-03	Phone meeting	18.11	Technical	H	Brandon Bray	Say more about finalizers (including Dispose/~T and Finalize/!T) and add some examples.		No	

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65	16-Dec-03	Phone meeting	18.1	Technical		Editor	As a cross-language issue, come up with terminology to distingish between destructors and finalizers. Perhaps "deterministic destructor" vs. "non-deterministic finalizer." Add some text in spec re this, esp. w.r.t C#'s use of destructor.		No	
66	16-Dec-03	Phone meeting	21	Editorial	M	Brandon Bray	Introduce value classes -- Discuss the following: value classes are optimized for small data structures. As such, value classes do not allow inheritance from anything but interface classes. Tie in fundamental classes.		No	
67	16-Dec-03	Phone meeting	21.4.1	Technical	H	Brandon Bray	Add words about instance constructors and static constructor. Value classes cannot have SMFs (specifically, default constructor, copy constructor, assignment operator, destructor, or finalizer. Need to add specification for this along with rationale.		No	
68	16-Dec-03	Phone meeting	22	Technical	L	Brandon Bray	Consider writing some text for this "place-holder" clause. Should this all go in the new annex "Future directions"?		No	
71	16-Dec-03	Phone meeting	23	Editorial	R	Brandon Bray	Will review this whole clause.		No	
74	16-Dec-03	Phone meeting	23.5	Technical	M	Brandon Bray	Look at array covariance w.r.t arrays having copy constructors.		No	
75	16-Dec-03	Phone meeting	23.6	Technical	M	Brandon Bray	Write up array initialization.		No	
76	16-Dec-03	Phone meeting	24.4	Technical	H	Brandon Bray	Address what happens when a ref class does not implement an interface function (and what happens when a base class has a non-virtual function with the same name).		No	
79	16-Dec-03	Phone meeting	27	Technical	H	Brandon Bray	Cover unification of CLI and Standard C++ exception-handling models, and anything else that might go in this clause. Are exceptions asynchronous now in some cases? Yes they are. (For example, NullReferenceException.)	Meeting #5 (WA): Kevin Free (Microsoft) gave a verbal presentation. catch(…) catches managed and native exceptions. catch(System::Object^) also catches both kinds, but won't invoke the destructor (so can leak). CLI exception handling supports more features than we expose. The issue remained with Brandon to write up, as before.	No	
81	16-Dec-03	Phone meeting	20.5.2	Technical	R	Brandon Bray	Describe MethodImplOption metadata generation.		No	
82	16-Dec-03	Phone meeting	29	Technical	M	Brandon Bray	Flesh out "Templates" clause.		No	
87	16-Dec-03	Phone meeting	A	Technical	L	Brandon Bray	Flesh out "Verifiable code" clause. Describe the dangers of pointer arithmetic and interior_ptrs.		No	
88	16-Dec-03	Phone meeting	B	Technical	L	Brandon Bray	Flesh out "Documentation comments" clause.		No	
90	16-Dec-03	Phone meeting	D	Technical		Editor	Add naming guidelines for generics		No	

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92	29-Jan-04	meeting #2 (HI)		Technical	M	Brandon Bray	"size size" name lookup issue (see email thread started by Herb Sutter on January 14 on the liaison reflector under the topic {Name lookup 1 (of 2): "Size Size" (CLI property naming idiom)}.)
							
							This is the common CLI idiom of naming a property (or potentially other members) with the same name as its type. In particular, here are two common examples:
							
							value class Size { /*…*/ };
							
							value class Color { /*…*/ };
							
							ref class X {
							public:
							property Size Size;
							property Color Color;
							};
							
							In other languages, it's easy to simply use the identifier "Size" without qualification and have the compiler Do the Right Thing™. But C++ name lookup is different. The status quo in Managed C++ syntax was that we made no change to C++ lookup rules, with the result that authors of classes that use this idiom are required to qualify most occurrences of "Size" which is ugly. The issue mostly appears only within the class itself (and in derived classes).
							
							Here's a brief description of the problem:
							
							ref class X {
							public:
							property Size Size {
									No	

94	29-Jan-04	meeting #2 (HI)		Technical		Mark Hall	Relationship between primitive types and CLI types. The current spec allows the following: int i = 10; String^ s = i.ToString(); Standard C++ doesn't allow member selection on expressions of primitive type. Assuming int maps to System::Int32, just how much alike are these two types? Specifically, when do we treat the primitive as the underlying class.	Meeting 5 (WA): Asked Mark to write this up and distribute to the reflector. Please address the side-effect issue; that is, given (i++).ToString, is the increment done? Meeting 7 (WA): ?? To be done in Tue morning work sessions. Re the side-effect, yes, it must be done.	No	
95	29-Jan-04	meeting #2 (HI)	10	Technical	H	Brandon Bray	Provide words for #using.		No	
96	29-Jan-04	meeting #2 (HI)	9.1.1	Technical	M	Brandon Bray	The spec does not provide a way to use a keyword as an identifier. (Managed C++ used the intrinsic __identifier(name) to achieve this; C# uses a leading @.) This is an issue for inter-operability; for example, being a consumer of a public type (written in something other than C++) that has a name (or contains a public member that has a name) that is a keyword in C++.		No	

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97	29-Jan-04	meeting #2 (HI)		Technical		Editor	Overloading on arity. (This is a liaison issue with TG3.) The issue involves the overloading of a non-generic type with a one or more generic types of the same name in the same namespace. For example, the following is permitted by the CLS: ref class X { /*…*/ }; generic<typename T> /*…*/ ref class X { /*…*/ }; generic<typename T, typename U> /*…*/ ref class X { /*…*/ };	Meeting 3 (Mel): Herb presented this issue, which was then reassigned to Brandon. Meeting 5 (WA): In this version, we'll support a generic and non-generic version of a type in the same namespace, but not in different namespaces. There was a discussion about using something like "using generic x::y" to provide cross-namespace support as well. Rex to work with Brandon to get this into the draft. Meeting 7 (WA): Herb reported that the MS implementation can consume same-named generics that overload on arity in the same assembly, but it cannot create them.	No	
98	29-Jan-04	meeting #2 (HI)	30	Technical	R	Brandon Bray	Restrictions on generics re generic code generation. The current generics clause needs to be fleshed out, especially w.r.t how overload resolution works within the CLI.	Meeting #2 (HI): Brandon will write a paper on this. Meeting #4 (NJ): The fleshing out of Clause 30 is a significant contribution toward this. More work needed in declarations and function calls.	No	
105	29-Jan-04	meeting #2 (HI)	14.5.1	Technical		Mark Hall	Constructors can't be used in casts in managed classes. Should they be allowed in explicit conversions? All managed type constructors being explicit by default. (Already yes, but reconfirm this.)	Meeting #4 (NJ): Steve will send the editor sufficient text to go into the public drop to indicate our intention re this topic. DONE. Meeting 5 (WA): Asked Mark to write this up and distribute to the reflector. Meeting 7 (WA): Steve and Mark worked on this and presented it to the full committee on the 2nd day. Mark will write this up for future consideration.	No	
106	29-Jan-04	meeting #2 (HI)		Technical		Daveed Vandevoorde	Should >> handled as two tokens rather than one; e.g., List<List<int>>.	Meeting #3 (Mel): Had a short discussion. Tom will produce a paper for the May meeting. Meeting #4 (NJ): TG5 agreed that if a < for a template is seen, and >> that are not inside parentheses, that >> will always be considered to be the closing delimiter of two < symbols, and results in an error if there are not two such corresponding < symbols. Refer to Daveed's paper WG21/N1649 for more information. Meeting #7 (WA): This paper was updated (see N1699). It was discussed in TG5 and will be discussed at the up-coming WG21 meeting, at which TG5 members will participate.	No	
109	19-Feb-04		12.3.6.3	Technical	L	Brandon Bray	Cover the dangers of pointer arithmetic and interior_ptrs		No	

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111	19-Feb-04		15.3.2	Technical	M	Brandon Bray	Need to consider how indexed access expressions are interpreted in templates.		No	
116	19-Feb-04		18.4.2	Technical	H	Brandon Bray	Add some discussion of how accesses to properties are rewritten into accessor functions. This should be covered in rewrite rules in the expressions clause. Note that access checking for whether a property can be written to or read to is done after rewriting and overload resolutions.		No	
117	19-Feb-04		18.4.2	Technical	H	Brandon Bray	The qualified name of a property needs to be described somewhere. Once that happens, how an out-of-class definition is done will already be covered by existing rules.		No	
121	19-Mar-04	meeting #3 (Mel)		Technical		Steve Adamczyk	In the context of Herb's keywords paper (2004-05), Steve will write up the notion "If it can be an identifier, it is."		No	
122	19-Mar-04	meeting #3 (Mel)		Technical		Steve Adamczyk	Write a WG21 paper on extended integer types, promotion rules, costs of conversion, and the like, for the May meeting.	Meeting #4 (NJ): Not yet done, but still planned.	No	

124	10-Jun-04	Jonathan Caves		Technical		Jonathan Caves	Indexed properties -- Consider the following:
							
							interface class I1 {
							  property int Value;
							};
							
							interface class I2 {
							  property int Value[String^] {
							  int get(String^);
							  void set(String^, int);
							  };
							};
							
							ref class D : I1, I2 {
							  // Implements the properties
							};
							
							D^ d;
							d->Value["Foo"];
							
							The question is what does the last line do?
							
							Which leads to a language design question - what should the complier do when faced with a property followed by a '['
							
							1) Should it look for just parameterized properties and if there isn't one fail - I suspect not
							
							2) Should it look for all properties and if the returned set contains a parameterized property it should prefer it - this sounds like magic to me.
							
							3) Should it look for all properties perform overload resolution across the whole set and it the resulting call is ambiguous then issue an error.
								Meeting #5 (WA): Discussed this. Option #3 preferred.
								
								Meeting 7 (WA): Discussed this in detail.
								
								property int Value[int] {
								  void set(int, int);
								};
								
								x->Value[1] = 4
								is treated as
								x->set_Value(1,4);
								
								--- 	
								
								property array<int>^ Value {
								  array<int>^ get();
								}
								
								x->Value[1] = 4
								is treated as
								x->get_Value()[1] = 4
								
								--- 	
								
								property int% Value[int] {
								  int% get(int);
								}
								
								x->Value[1] = 4
								is treated as
								x->get_Value(1) = 4
								
								This construct violates the principle of properties (that of setting/getting the value of some property), so is not to be encouraged; however, it is supported, but no need to consider it further here.
									No	

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125	14-Jun-04	meeting #5 (WA)	8.15.3	Technical	M	Brandon Bray	Based on the rules for type deduction in templates, it seems surprising that you can match array<ItemType>^ with an argument of type int. Here is a standard C++ example intended to illustrate the issue:
							template <class ItemType> struct Stack {};
							template <class ItemType> struct Array {
							Array(ItemType);
							};
							template <class ItemType>
							void PushMultiple(Stack<ItemType>, Array<ItemType>);
							int main() {
							Stack<int> s;
							PushMultiple(s, 1); // deduction fails
							PushMultiple<int>(s, 1);
							}
							Are the rules for generic different in this area? [There seems to be information related to this in 30.3.2. See that subclause for further comments on this issue.]
									No	

126	14-Jun-04	meeting #5 (WA)	12.1	Technical		Editor	The type long long will be defined by pointing to	Meeting 7 (WA): Steve has produced a revised version, N1693. Editor to fold this in the spec. TG5 understands that WG21 has not yet accepted this paper, but is expected to at its Oct 2004 meeting.	No	
127	14-Jun-04	meeting #5 (WA)	12.3.3	Technical	L	Brandon Bray	Add text to indicate the circumstances under which the modreq IsBoxed shall be emitted (i.e., passing		No	
128	14-Jun-04	meeting #5 (WA)	12.3.6	Technical	L	Brandon Bray	The compiler will need to emit a modopt to distinguish interior_ptr<T> from tracking reference to T (		No	
129	14-Jun-04	meeting #5 (WA)	12.3.7	Technical	L	Brandon Bray	Need to add text to indicate the circumstances under which the modopt IsPinned shall be emitted (i.e.,		No	
130	14-Jun-04	meeting #5 (WA)	14.1.1	Technical	L	Brandon Bray	Separate the list of conversions from the order of preference (such as how Standard C++ separates Sta		No	

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131	14-Jun-04	meeting #5 (WA)	15.3.3	Technical	L	Brandon Bray	Add text to indicate the circumstances under which the following type modifiers shall be emitted, and point to each modifier's definition: • IsBoxed i.e., passing a handle to a value type). • IsByValue (i.e., ref class type passed by value). • IsConst (i.e., pointer or reference to a const-qualified type). • IsExplicitlyDereferenced (i.e., interior_ptr as a parameter). • IsImplicitlyDereferenced (i.e., parameter is a reference). • IsLong (i.e., long/unsigned long/long double parameters). • IsExplicitlyDereferenced (i.e., pin_ptr as a parameter). • IsSignUnspecifiedByte (i.e., plain char's sigedness). • IsUdtReturn (i.e., ref class type returned by value). • IsVolatile (i.e., pointer or reference to a volatile-qualified type).		No	
132	14-Jun-04	meeting #5 (WA)	15.3.10	Technical	M	Brandon Bray	Unboxing and boxing are described as preferred user-defined conversions. Nothing important about th		No	
133	14-Jun-04	meeting #5 (WA)	15.3.10	Technical	L	Brandon Bray	The null value is converted to the null value of the destination type. This can be unverifiable and migh		No	
134	14-Jun-04	meeting #5 (WA)	16.3.3	Technical	L	Brandon Bray	Need to add text to indicate the circumstances under which the modreq IsUdtReturn shall be emitted (		No	
135	14-Jun-04	meeting #5 (WA)	18	Technical	R	Brandon Bray	This table and corresponding sections should include Special Member Functions (SMFs) like destruct		No	
136	14-Jun-04	meeting #5 (WA)	18.2.1	Technical	L	Brandon Bray	Need to address the following: C++/CLI uses the System::Reflection::DefaultMemberAttribute attribu		No	
138	14-Jun-04	meeting #5 (WA)	18.4	Technical		Mark Hall	Need to write up the restrictions on trivial properties.		No	
139	14-Jun-04	meeting #5 (WA)	18.4	Technical	L	Brandon Bray	We probably should say something about the reserved names get_Item and set_Item, and their relation		No	
142	14-Jun-04	meeting #5 (WA)	18.5.3	Technical	L	Brandon Bray	An event with the new modifier introduces a new event that does not override an event from a base cl		No	
143	14-Jun-04	meeting #5 (WA)	18.6	Technical	L	Brandon Bray	The restriction below does not apply to non-static member operators – that need not have a parameter		No	
144	14-Jun-04	meeting #5 (WA)	18.6.1	Technical	L	Brandon Bray	Provide an example for "Homogenizing the candidate overload set".		No	
145	14-Jun-04	meeting #5 (WA)	18.6.5.2	Technical	L	Brandon Bray	Provide C++ names for operator True and False		No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
148	14-Jun-04	meeting #5 (WA)	20.2	Technical	L	Brandon Bray	Add text to indicate the circumstances under which the following type modifiers shall be emitted, and point to each modifier's definition: • IsConst (i.e., data member involves a cv type). • IsImplicitlyDereferenced (i.e., has a reference type). • IsLong (i.e., long/unsigned long/long double type). • IsSignUnspecifiedByte (i.e., plain char's sigedness). • IsVolatile (i.e., data member involves a cv type).		No	
149	14-Jun-04	meeting #5 (WA)	20.3	Technical	L	Brandon Bray	Add text to indicate the circumstances under which the following type modifiers shall be emitted, and point to each modifier's definition: • IsBoxed i.e., passing a handle to a value type). • IsByValue (i.e., ref class type passed by value). • IsConst (i.e., pointer or reference to a const-qualified type). • IsExplicitlyDereferenced (i.e., interior_ptr as a parameter). • IsImplicitlyDereferenced (i.e., parameter is a reference). • IsLong (i.e., long/unsigned long/long double parameters). • IsExplicitlyDereferenced (i.e., pin_ptr as a parameter). • IsSignUnspecifiedByte (i.e., plain char's signedness). • IsUdtReturn (i.e., ref class type returned by value). • IsVolatile (i.e., pointer or reference to a volatile-qualified type).		No	
151	14-Jun-04	meeting #5 (WA)	24.2	Technical	M	Brandon Bray	The note says "pickup the restrictions from page 333". Brandon, do you have any idea what this page		No	
154	14-Jun-04	meeting #5 (WA)	30.1	Technical	R	Brandon Bray	Doesn't the text "a generic name declared in namespace scope or in class scope shall be unique in that		No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
155	14-Jun-04	meeting #5 (WA)	30.1	Technical	R	Brandon Bray	What is a non-generic type? Does it mean that the rules are the same as classes? As template classes?		No	
156	14-Jun-04	meeting #5 (WA)	30.1	Technical		Editor	Can generic types be nested in native classes?		No	
158	14-Jun-04	meeting #5 (WA)	30.1.1	Technical	R	Brandon Bray	The equivalent wording for template parameters in the working paper has been changed to "defines its		No	
159	14-Jun-04	meeting #5 (WA)	30.1.2	Technical	R	Brandon Bray	30.1.2 says "Like templates in Standard C++, within the body of a generic type any usage of the unqualified unadorned name of that type is assumed to refer to the current instantiation." 30.1.3 then goes on to describe "The instance type". Those seem like to different ways of describing the same concept. Can they be unified in some way?		No	
160	14-Jun-04	meeting #5 (WA)	30.1.6	Technical	R	Brandon Bray	This subclause describes when a static constructor is invoked. In 18.8, it references the CLI Standard Partition II (10.5.3). Are the rules the same? (Yes) Should this subclause also just reference the CLI spec? There are two sets of behavior; we need to say which one we use.		No	
161	14-Jun-04	meeting #5 (WA)	30.1.7	Technical	M	Brandon Bray	What to say about explicit conversion functions (which can only occur in managed class types)?		No	
162	14-Jun-04	meeting #5 (WA)	30.2.2	Technical	R	Brandon Bray	This subclause lists the types that can and cannot be generic arguments. Fundamental types are not in		No	
163	14-Jun-04	meeting #5 (WA)	30.2.4	Technical	R	Brandon Bray	"The non-inherited members of a constructed type are obtained by substituting, for each generic-parameter in the member declaration, the corresponding generic-argument of the constructed type. The substitution process is based on the semantic meaning of type declarations, and is not simply textual substitution." It would be helpful to explain this in more detail and/or give an example where this makes a difference.		No	
165	14-Jun-04	meeting #5 (WA)	30.3	Technical	L	Brandon Bray	Types not used as a parameter type to a generic function cannot be deduced. Are the nondeduced context rules the same as Standard C++ or not? The sentence before this is true, but not complete if the rules are the same as Standard C++.		No	
167	14-Jun-04	meeting #5 (WA)	30.3	Technical	L	Brandon Bray	"When the type of a parameter or variable is a type parameter, the declaration of that parameter or variable shall use that type parameter's name without any pointer, reference, or handle declarators." What about cv-qualifiers?		No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
168	14-Jun-04	meeting #5 (WA)	30.3	Technical	L	Brandon Bray	Can you take the address of a generic function ins	Meeting #6 (WA): Tentatively decided, NO.	No	
169	14-Jun-04	meeting #5 (WA)	30.3.2	Technical	L	Brandon Bray	The issue raised in 8.15.3 is somewhat answered here. 18.3.6 seems to deal with expanded forms of calls, not expanded forms of function declarations. I interpret the text above as saying that deduction is done as if the function were declared like this: generic <typename ItemType> void PushMultiple(Stack<ItemType>^, ItemType i1, ItemType i2,/* ... */); Is that correct? I think this requires a more detailed description.		No	
170	14-Jun-04	meeting #5 (WA)	30.3.2	Technical	L	Brandon Bray	Something needs to be said about instantiating a generic delegate using a generic function.		No	
171	14-Jun-04	meeting #5 (WA)	30.4.2	Technical	L	Brandon Bray	When are members considered hidden? Is it using the rules described later? Those are described as a		No	
172	14-Jun-04	meeting #5 (WA)	30.4.4	Technical	L	Brandon Bray	Miscellaneous generics issues: 1. I seem to recall discussions of other kinds of constraints (I believe one of them concerned whether you could do a "new T()"). 2. Doesn't there need to be some discussion of how overload resolution works when a function argument has a type parameter as its type? 3. Are the typename and template rules for syntactic disambiguation the same in generics as in templates? Presumably, the lack of specialization would eliminate the need for these. 4. If scope contains a set of overloaded generic functions, is partial ordering used to choose between them? 5. I assume since there is nothing that says otherwise, that generics can be friends of other classes and generics can make other classes, functions, (including generics) friends? 6. If friendship is supported, can a generic first be declared in a friend declaration (suggested answer: no). 7. Standard C++ has restrictions on type parameters such as prohibiting types with no linkage. Does this rule apply to generic arguments? 8. Are there generic conversion functions?		No	
173	14-Jun-04	meeting #5 (WA)	32.1.4	Technical	L	Brandon Bray	To ensure that signatures for the same Type produced by different implementations match, the ordering in such a set of modreqs and modopts is as follows: first modreqs in ascending order by name, then modopts in ascending order by name, with case being significant. [[We need some rule here; is this the one?]].		No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
174	14-Jun-04	meeting #5 (WA)	32.1.4	Technical	L	Brandon Bray	If IsBoxed is retained for the standard, we have an ordering issue to consider: Currently, the value-typ		No	
175	14-Jun-04	meeting #5 (WA)	32.1.5.1	Technical	L	Brandon Bray	This modifier [IsBoxed] is a workaround for the MS implementation. Does it have any long-term valu		No	
176	14-Jun-04	meeting #5 (WA)	E	Technical	L	Brandon Bray	Flesh out Future Directions		No	
179	23-Jul-04	TG3 liaison		Technical		Mark Hall	Support for Hide-By-Signature on Methods in ref classes	See email thread started by Rex J. on Jul 24. Meeting #6 (WA): Some possible ways to address this (and results of a straw poll) are: 1) Support hidebyname only and issue better error messages. [0 in favour] 2) Make all ref class methods be hidebysig; a. Only [0 in favour] b. Default, with an option to select hidebyname [6 in favour] 3) Add hidebysig keyword to allow explicit marking of methods. [0 in favour] with 3 people unsure. We could go two routes: A) Bring hidebysig in via "using" directive to hoist base class/interface names (this is an approximate solution only, as it doesn't allow hoist-by-signature, only hoist-by-name) [0 in favour] B) Do repeated lookup in all base classes (like C#) [8 in favour] Tom circulated the relevant pages from the CLI spec (Partition I, 7.10.4). We need to take into account the CLS rules when resolving this issue. Meeting #7 (WA): Had a brief discussion. No progress.	No	
182	26-Jul-04	phone meeting		Technical	H	Brandon Bray	Discussion of passing a string literal in the presence of overloads taking String^ and const char * (what about char *?)	Meeting #6 (WA): The compiler currently chooses the String^ over the const char*. Involves type deduction across templates and generics. Reassigned from Mark to Brandon. String literal portion of issue 12 was transferred to #182.	No	
183	2-Aug-04	meeting #6 (WA)		Technical	L	Brandon Bray	Overload assignment operator for handles.	Post-meeting #7. MS design team discussed this and believes that we should drop this issue.	No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**

184	2-Aug-04	meeting #6 (WA)		Technical		Herb Sutter	Describe problem with overloading on % vs. &
							
							Herb presented the following code:
							
							#include <iostream>
							using namespace std;
							void f(const int&) { cout << "f(const int&)" << endl; }
							void f(int&) { cout << "f(int&)" << endl; }
							
							void g(int%) { cout << "g(int%)" << endl; }
							void g(int&) { cout << "g(int&)" << endl; }
							
							int main() {
							const int ci = 0;
							int i = 0;
							int^ hi = gcnew int;
							
							f(ci);
							f(i);
							
							g(*hi);
							// g(i); // ambiguous: should g(int&) be preferred?
							}
							
							The following code was his attempt to write an agnostic swap:
							
							template<typename T>
							void swap(T% a, T% b) {
							#if defined NO_PIN_PTR // doesn't work
							T temp = a; a = b; b = temp;
							#elif defined PIN_PTR_BUG // doesn't compile
							T temp = *pin_ptr<T>(a);
							*pin_ptr<T>(*pa) = *pin_ptr<T>(*pb);
									No	

185	2-Aug-04	meeting #6 (WA)		Technical		Herb Sutter	Collapsing reference to reference. (It's in the C++0x spec.)		No	
186	2-Aug-04	meeting #6 (WA)		Technical	L	Brandon Bray	Should we standardize traits?		No	
188	2-Aug-04	meeting #6 (WA)		Technical	H	Brandon Bray	Look at using + to implement String concatenation.		No	
189	2-Aug-04	meeting #6 (WA)		Technical		??	Look at the changes to the grammar for C++0x and note where they affect the C++/CLI grammar.		No	
191	2-Aug-04	meeting #6 (WA)		Technical	M	Brandon Bray	Review the specification checking the usage of accessibility vs. visibility		No	
192	2-Aug-04	meeting #6 (WA)		Technical	L	Brandon Bray	Provide an annex containing the differences between the grammar of Standard C++ and C++/CLI		No	
193	2-Aug-04	meeting #6 (WA)		Technical		Sean Perry	Look at the issue of whether or not the mapping of bool should be implementation-defined.	Meeting 7 (WA): Sean wrote this up and presented it to the full committee on the 2nd day. Based on committee feedback, Sean will revise his paper for future consideration.	No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
194	2-Aug-04	Anthony Williams	15.3.2	Technical		Jonathan Caves	Re Anthony's post to the reflector re "default index	Meeting 7 (WA): Discussed the possibility of disallowing both the default indexed property and operator[].	No	
195	25-Aug-04	Rex Jaeschke	14.1.	Technical	L	Brandon Bray	Separate the list of conversions from the order of preference (such as how Standard C++ separates Standard Conversions from overload resolution).		No	
196	30-Sep-04	meeting #7 (WA)		Technical		Herb Sutter	In native types, % behaves like &.		No	
198	30-Sep-04	meeting #7 (WA)	2	Technical		Tom Plum	Propose wording to require that extensions over and above ISO C++ requirements, be diagnosed.		No	
199	30-Sep-04	meeting #7 (WA)	16.2.1	Technical	R	Brandon Bray	Proof the text on Collection type and how a for each is executed.		No	
200	30-Sep-04	meeting #7 (WA)		Technical					No	
201	30-Sep-04	meeting #7 (WA)		Technical					No	

2004-09 Project Editor's Report

Rex Jaeschke

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Working Draft 1.7 has been produced and distributed. The following work went into producing it:

1. I applied corrections resulting from the Redmond Aug meeting.
2. I made many changes to the narrative to accommodate the grammar Brandon supplied for WD1.6. However, most of those changes were strictly editorial in nature, and were not tracked (that's why I cancelled the grammar-related editorial review phone meeting previously scheduled for Sep 13).
3. The text set in Post-Whidbey style indicated future possibilities. As such, I have moved them to Annex F, "Future directions."
4. I made many improvements of an editorial nature; these were not tracked. (They included changing numerous examples so that properties were no longer in native classes.)
5. Clause 25, "Enums", was rewritten and expanded.
6. Eventually, we need to add text w.r.t Metadata generation for certain constructs. I've started this off with clause 24, "Enums", and 26, "Delegates". The trick is to say enough, but not too much that we're duplicating a lot of what's already in the CLI standard. (After all, an implementer of C++/CLI will have to be familiar with the CLI Partitions.)

   While we can't and don't want to require application programmers to write CLS-compliant code, we can and probably should require that a conforming C++/CLI implementation generate CLS-compliant metadata whenever possible. So the guiding principles I propose are:

   - As far as is practical, a conforming implementation of C++/CLI shall generate metadata that is CLS-compliant.
   - For non-compliant features, for interop between conforming implementations of C++/CLI, it is reasonable and useful to impose certain requirements (which, typically, would reflect MS's implementation behavior).

   We could make statements to this effect in the conformance clause. Admittedly, bullet 1 is a bit vague, but since pointers (among other common C++ idioms) are not CLS-compliant, we can't mandate this for everything. However, if we can find reasonable words to make a strong and realistic requirement, I believe that would be a good addition.
7. As directed by the Aug meeting minutes, I added a new annex (H. Portability issues) that summarizes unspecified, undefined, and implementation-defined behaviors.

TG5 Convener's Report to TC39

24 September 2004

Officers

Convener: Dr. Thomas Plum, Plum Hall Inc

Editor: Mr. Rex Jaeschke, Microsoft Corporation

Meetings

The following meetings and phone conferences have occurred since the March 2004 report:

3-4 May 2004	Face-to-Face, Westfield NJ, USA, hosted by EDG and Dinkumware
14-15 June 2004	Face-to-Face, Redmond, WA, USA, hosted by Microsoft
29 June 2004	Phone conference
13 July 2004	Phone conference
27 July 2004	Phone conference
2-3 August 2004	Face-to-Face, Redmond, WA, USA, hosted by Microsoft
20-21 September 2004	Face-to-Face, Redmond, WA, USA, hosted by Microsoft

The next upcoming face-to-face meeting is:

22-23 October 2004	Face-to-Face, Redmond, WA, USA, hosted by Microsoft

Attendees

The meetings were attended by representatives from member companies Borland, Dinkumware Ltd, Edison Design Group, IBM, Microsoft, and Plum Hall. Invited guests included representatives from Jagger Software.

Progress

Over the last 6 months, the TG5 has had 4 face-to-face meetings and 3 phone conferences.

Latest Status:

The current working draft of the specification is WD1.7 (as of the September meeting). The TG agreed to push the finalization of edition 1 from September 2004 to March 2005. The TG did not want to rush a specification that was not ready. Also, the push allows for a better alignment with key implementations of the CLI specification. As of 18 September 2004, there are 94 outstanding technical action items, and 9 editorial action items, some of which just need an official re-visit to resolve. The convener would like to thank the task group for all of their hard work during the last six months.

Drafts to be submitted to TC for adoption

None

Thomas Plum

Convener TG5

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
10	4-Dec-03	meeting #1 (TX)	14	Technical	M	Brandon Bray	pull together all the conversion information into one place. Make sure all conversions are covered.		No	
11	4-Dec-03	meeting #1 (TX)	15.3.2	Technical		Steve Adamczyk	comma vs. semicolon as separator in indexed access expressions In indexed access expressions (§15.3.2), comma operators are currently disallowed inside [ ] unless they are enclosed in parentheses. This conflicts with usage in existing template libraries (e.g., Lambda), in which the comma operator occurs inside [ ] without enclosing it in parentheses.	Meeting #2 (HI): Can we treat commas in [ ] not having enclosing parenthesis, in any context, always be treated as punctuators? Yes. Steve will provide words to the editor for this. Meeting #3 (Mel): Steve produced a paper. He reported one outstanding issue: In 15.3.2, "Indexed Access", in the C++/CLI spec is rather vague. There, we have indexed-access: indexed-designator [expression-list] where indexed-access is defined as an additional alternative for postfix-expression: postfix-expression: indexed-access Unfortunately, there isn't any definition of indexed-designator, so I'm not quite sure whether all the multi-dimensional cases are supposed be handled by indexed-designator, leaving the traditional cases to be handled by the original (possibly modified) syntax. An alternative would be not to introduce indexed-access at all, and use the definition postfix-expression: postfix-expression [expression-list] to handle all the cases, for both traditional subscripting and the new C++/CLI indexer references. There was agreement to this, so Steve will update his p	No	
13	4-Dec-03	meeting #1 (TX)	12	Technical	M	Brandon Bray	Add a diagram of the type tree		No	
19	5-Dec-03	meeting #1 (TX)		Technical	L	Brandon Bray	list of overlap between Standard C++ and features proposed by C++/CLI		No	
23	16-Dec-03	Phone meeting	8.2.3	Editorial	H	Brandon Bray	Say more, especially w.r.t the template class array<element-type>.		No	
24	16-Dec-03	Phone meeting	9	Technical	R	Brandon Bray	Review this clause.		No	
25	16-Dec-03	Phone meeting	10	Technical	H	Brandon Bray	Revise this clause by covering topics including application entry point, assembly boundaries, among others.		No	
27	16-Dec-03	Phone meeting	12.13.6	Technical	H	Brandon Bray	Describe how interior_ptr, pin_ptr, array, and safe_cast are template-like with certain constraints.		No	
28	16-Dec-03	Phone meeting	12.3.6	Technical	M	Brandon Bray	Describe how the compiler will need to emit a modopt to distinguish interior_ptr<T> from tracking reference to T (T%) in the metatada.		No	
29	16-Dec-03	Phone meeting	12.3.6.2	Technical	M	Brandon Bray	Spell out target type restrictions		No	
32	16-Dec-03	Phone meeting	13	Technical		Tom Plum	What, if anything, goes in this clause?		No	
33	16-Dec-03	Phone meeting	14.1.1	Editorial	R	Brandon Bray	Review this subclause.		No	
34	16-Dec-03	Phone meeting	14.4	Editorial	R	Brandon Bray	Review this subclause.		No	
35	16-Dec-03	Phone meeting	15.1	Technical	H	Brandon Bray	The rewrite rules for e[x] (default indexed accesses) are different where there is only one index. This is because there is a potential ambiguity with the C++ operator[]. Is this mentioned elsewhere?		No	
36	16-Dec-03	Phone meeting	15.3.8	Technical	M	Brandon Bray	cv-qualification needs to be considered.		No	
38	16-Dec-03	Phone meeting	15.3.9	Technical	L	Brandon Bray	Provide a spec for standard typeid (that returns std::type_info) in addition to the new typeid (that returns System::Type).		No	

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1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
39	16-Dec-03	Phone meeting	15.3.13	Editorial	H	Brandon Bray	Update this subclause		No	
40	16-Dec-03	Phone meeting	15.4.1.1	Editorial	R	Brandon Bray	Review this subclause.		No	
43	16-Dec-03	Phone meeting	15.11.1	Technical		Mark Hall	Add support for handle equality comparison, and handle ==/!= nullptr, and vice versa.	Meeting #3 (Mel): Had a short discussion. Mark will produce a paper for the May meeting. Meeting #4 (NJ): No progress. To be discussed via email, and at the Jun meeting Meeting #5 (WA): Discussed briefly. Asked Mark to write this up and distribute to the reflector. Phone call Jun 29: This issue was resolved; just needs drafting of final words. Meeting 7 (WA): In the case of if(handle), which conversions are attempted before comparison against nullptr is used? We agreed that if an explicit conversion to bool exists, if(handle) uses that. There is no implicit unboxing. Steve and Mark worked on this and presented it to the full committee on the 2nd day. Based on committee feedback, Mark will write this up for future consideration.	No	
44	16-Dec-03	Phone meeting	15.18	Technical	H	Brandon Bray	Add words to discuss assignment for properties and events from the point of view of the rewrite rules.		No	
47	16-Dec-03	Phone meeting	17	Technical	M	Brandon Bray	Provide text for this clause		No	
50	16-Dec-03	Phone meeting	18.4	Technical	M	Brandon Bray	Extend declarator-id's by adding a new production that allows default.		No	
52	16-Dec-03	Phone meeting	18.4.2	Technical	H	Brandon Bray	This subclause only covers how the accessor functions must be defined. The expressions clause needs to cover the rewrite rules that call accessor functions.		No	
54	16-Dec-03	Phone meeting	18.5.2	Editorial	R	Brandon Bray	Review this subclause.		No	
55	16-Dec-03	Phone meeting	18.6	Editorial	R	Brandon Bray	Review this subclause.		No	
56	16-Dec-03	Phone meeting	18.6.4	Technical	M	Brandon Bray	Identify when synthesis would and would not occur.		No	
57	16-Dec-03	Phone meeting	18.6.5.1	Technical	L	Brandon Bray	Writeup op_true and op_false operators		No	
58	16-Dec-03	Phone meeting	18.6.6.1	Technical		Mark Hall	Reword this subclause similarly to the way special member functions are described.	Meeting 7 (WA): ?? To be done in Tue morning work sessions.	No	
59	16-Dec-03	Phone meeting	18.6.6.1	Technical	H	Brandon Bray	Add another subclause to cover the compiler-generated conversion from handle to unspecified bool type.	Meeting 7 (WA): ?? To be done in Tue morning work sessions.	No	
62	16-Dec-03	Phone meeting	18.10.1	Technical	L	Brandon Bray	Add a description that for any value class we have to make the copy before calling member functions.		No	
63	16-Dec-03	Phone meeting	18.11	Technical	H	Brandon Bray	Say more about finalizers (including Dispose/~T and Finalize/!T) and add some examples.		No	

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1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
65	16-Dec-03	Phone meeting	18.1	Technical		Editor	As a cross-language issue, come up with terminology to distingish between destructors and finalizers. Perhaps "deterministic destructor" vs. "non-deterministic finalizer." Add some text in spec re this, esp. w.r.t C#'s use of destructor.		No	
66	16-Dec-03	Phone meeting	21	Editorial	M	Brandon Bray	Introduce value classes -- Discuss the following: value classes are optimized for small data structures. As such, value classes do not allow inheritance from anything but interface classes. Tie in fundamental classes.		No	
67	16-Dec-03	Phone meeting	21.4.1	Technical	H	Brandon Bray	Add words about instance constructors and static constructor. Value classes cannot have SMFs (specifically, default constructor, copy constructor, assignment operator, destructor, or finalizer. Need to add specification for this along with rationale.		No	
68	16-Dec-03	Phone meeting	22	Technical	L	Brandon Bray	Consider writing some text for this "place-holder" clause. Should this all go in the new annex "Future directions"?		No	
71	16-Dec-03	Phone meeting	23	Editorial	R	Brandon Bray	Will review this whole clause.		No	
74	16-Dec-03	Phone meeting	23.5	Technical	M	Brandon Bray	Look at array covariance w.r.t arrays having copy constructors.		No	
75	16-Dec-03	Phone meeting	23.6	Technical	M	Brandon Bray	Write up array initialization.		No	
76	16-Dec-03	Phone meeting	24.4	Technical	H	Brandon Bray	Address what happens when a ref class does not implement an interface function (and what happens when a base class has a non-virtual function with the same name).		No	
79	16-Dec-03	Phone meeting	27	Technical	H	Brandon Bray	Cover unification of CLI and Standard C++ exception-handling models, and anything else that might go in this clause. Are exceptions asynchronous now in some cases? Yes they are. (For example, NullReferenceException.)	Meeting #5 (WA): Kevin Free (Microsoft) gave a verbal presentation. catch(…) catches managed and native exceptions. catch(System::Object^) also catches both kinds, but won't invoke the destructor (so can leak). CLI exception handling supports more features than we expose. The issue remained with Brandon to write up, as before.	No	
81	16-Dec-03	Phone meeting	20.5.2	Technical	R	Brandon Bray	Describe MethodImplOption metadata generation.		No	
82	16-Dec-03	Phone meeting	29	Technical	M	Brandon Bray	Flesh out "Templates" clause.		No	
87	16-Dec-03	Phone meeting	A	Technical	L	Brandon Bray	Flesh out "Verifiable code" clause. Describe the dangers of pointer arithmetic and interior_ptrs.		No	
88	16-Dec-03	Phone meeting	B	Technical	L	Brandon Bray	Flesh out "Documentation comments" clause.		No	
90	16-Dec-03	Phone meeting	D	Technical		Editor	Add naming guidelines for generics		No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**

92	29-Jan-04	meeting #2 (HI)		Technical	M	Brandon Bray	"size size" name lookup issue (see email thread started by Herb Sutter on January 14 on the liaison reflector under the topic {Name lookup 1 (of 2): "Size Size" (CLI property naming idiom)}.)
							
							This is the common CLI idiom of naming a property (or potentially other members) with the same name as its type. In particular, here are two common examples:
							
							value class Size { /*…*/ };
							
							value class Color { /*…*/ };
							
							ref class X {
							public:
							property Size Size;
							property Color Color;
							};
							
							In other languages, it's easy to simply use the identifier "Size" without qualification and have the compiler Do the Right Thing™. But C++ name lookup is different. The status quo in Managed C++ syntax was that we made no change to C++ lookup rules, with the result that authors of classes that use this idiom are required to qualify most occurrences of "Size" which is ugly. The issue mostly appears only within the class itself (and in derived classes).
							
							Here's a brief description of the problem:
							
							ref class X {
							public:
							property Size Size {
									No	

94	29-Jan-04	meeting #2 (HI)		Technical		Mark Hall	Relationship between primitive types and CLI types. The current spec allows the following: int i = 10; String^ s = i.ToString(); Standard C++ doesn't allow member selection on expressions of primitive type. Assuming int maps to System::Int32, just how much alike are these two types? Specifically, when do we treat the primitive as the underlying class.	Meeting 5 (WA): Asked Mark to write this up and distribute to the reflector. Please address the side-effect issue; that is, given (i++).ToString, is the increment done? Meeting 7 (WA): ?? To be done in Tue morning work sessions. Re the side-effect, yes, it must be done.	No	
95	29-Jan-04	meeting #2 (HI)	10	Technical	H	Brandon Bray	Provide words for #using.		No	
96	29-Jan-04	meeting #2 (HI)	9.1.1	Technical	M	Brandon Bray	The spec does not provide a way to use a keyword as an identifier. (Managed C++ used the intrinsic __identifier(name) to achieve this; C# uses a leading @.) This is an issue for inter-operability; for example, being a consumer of a public type (written in something other than C++) that has a name (or contains a public member that has a name) that is a keyword in C++.		No	

	A	B	C	D	E	F	G	H	I	J
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97	29-Jan-04	meeting #2 (HI)		Technical		Editor	Overloading on arity. (This is a liaison issue with TG3.) The issue involves the overloading of a non-generic type with a one or more generic types of the same name in the same namespace. For example, the following is permitted by the CLS: ref class X { /*…*/ }; generic<typename T> /*…*/ ref class X { /*…*/ }; generic<typename T, typename U> /*…*/ ref class X { /*…*/ };	Meeting 3 (Mel): Herb presented this issue, which was then reassigned to Brandon. Meeting 5 (WA): In this version, we'll support a generic and non-generic version of a type in the same namespace, but not in different namespaces. There was a discussion about using something like "using generic x::y" to provide cross-namespace support as well. Rex to work with Brandon to get this into the draft. Meeting 7 (WA): Herb reported that the MS implementation can consume same-named generics that overload on arity in the same assembly, but it cannot create them.	No	
98	29-Jan-04	meeting #2 (HI)	30	Technical	R	Brandon Bray	Restrictions on generics re generic code generation. The current generics clause needs to be fleshed out, especially w.r.t how overload resolution works within the CLI.	Meeting #2 (HI): Brandon will write a paper on this. Meeting #4 (NJ): The fleshing out of Clause 30 is a significant contribution toward this. More work needed in declarations and function calls.	No	
105	29-Jan-04	meeting #2 (HI)	14.5.1	Technical		Mark Hall	Constructors can't be used in casts in managed classes. Should they be allowed in explicit conversions? All managed type constructors being explicit by default. (Already yes, but reconfirm this.)	Meeting #4 (NJ): Steve will send the editor sufficient text to go into the public drop to indicate our intention re this topic. DONE. Meeting 5 (WA): Asked Mark to write this up and distribute to the reflector. Meeting 7 (WA): Steve and Mark worked on this and presented it to the full committee on the 2nd day. Mark will write this up for future consideration.	No	
106	29-Jan-04	meeting #2 (HI)		Technical		Daveed Vandevoorde	Should >> handled as two tokens rather than one; e.g., List<List<int>>.	Meeting #3 (Mel): Had a short discussion. Tom will produce a paper for the May meeting. Meeting #4 (NJ): TG5 agreed that if a < for a template is seen, and >> that are not inside parentheses, that >> will always be considered to be the closing delimiter of two < symbols, and results in an error if there are not two such corresponding < symbols. Refer to Daveed's paper WG21/N1649 for more information. Meeting #7 (WA): This paper was updated (see N1699). It was discussed in TG5 and will be discussed at the up-coming WG21 meeting, at which TG5 members will participate.	No	
109	19-Feb-04		12.3.6.3	Technical	L	Brandon Bray	Cover the dangers of pointer arithmetic and interior_ptrs		No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
111	19-Feb-04		15.3.2	Technical	M	Brandon Bray	Need to consider how indexed access expressions are interpreted in templates.		No	
116	19-Feb-04		18.4.2	Technical	H	Brandon Bray	Add some discussion of how accesses to properties are rewritten into accessor functions. This should be covered in rewrite rules in the expressions clause. Note that access checking for whether a property can be written to or read to is done after rewriting and overload resolutions.		No	
117	19-Feb-04		18.4.2	Technical	H	Brandon Bray	The qualified name of a property needs to be described somewhere. Once that happens, how an out-of-class definition is done will already be covered by existing rules.		No	
121	19-Mar-04	meeting #3 (Mel)		Technical		Steve Adamczyk	In the context of Herb's keywords paper (2004-05), Steve will write up the notion "If it can be an identifier, it is."		No	
122	19-Mar-04	meeting #3 (Mel)		Technical		Steve Adamczyk	Write a WG21 paper on extended integer types, promotion rules, costs of conversion, and the like, for the May meeting.	Meeting #4 (NJ): Not yet done, but still planned.	No	

124	10-Jun-04	Jonathan Caves		Technical		Jonathan Caves	Indexed properties -- Consider the following:
							
							interface class I1 {
							  property int Value;
							};
							
							interface class I2 {
							  property int Value[String^] {
							  int get(String^);
							  void set(String^, int);
							  };
							};
							
							ref class D : I1, I2 {
							  // Implements the properties
							};
							
							D^ d;
							d->Value["Foo"];
							
							The question is what does the last line do?
							
							Which leads to a language design question - what should the complier do when faced with a property followed by a '['
							
							1) Should it look for just parameterized properties and if there isn't one fail - I suspect not
							
							2) Should it look for all properties and if the returned set contains a parameterized property it should prefer it - this sounds like magic to me.
							
							3) Should it look for all properties perform overload resolution across the whole set and it the resulting call is ambiguous then issue an error.
								Meeting #5 (WA): Discussed this. Option #3 preferred.
								
								Meeting 7 (WA): Discussed this in detail.
								
								property int Value[int] {
								  void set(int, int);
								};
								
								x->Value[1] = 4
								is treated as
								x->set_Value(1,4);
								
								--- 	
								
								property array<int>^ Value {
								  array<int>^ get();
								}
								
								x->Value[1] = 4
								is treated as
								x->get_Value()[1] = 4
								
								--- 	
								
								property int% Value[int] {
								  int% get(int);
								}
								
								x->Value[1] = 4
								is treated as
								x->get_Value(1) = 4
								
								This construct violates the principle of properties (that of setting/getting the value of some property), so is not to be encouraged; however, it is supported, but no need to consider it further here.
									No	

	A	B	C	D	E	F	G	H	I	J
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125	14-Jun-04	meeting #5 (WA)	8.15.3	Technical	M	Brandon Bray	Based on the rules for type deduction in templates, it seems surprising that you can match array<ItemType>^ with an argument of type int. Here is a standard C++ example intended to illustrate the issue:
							template <class ItemType> struct Stack {};
							template <class ItemType> struct Array {
							Array(ItemType);
							};
							template <class ItemType>
							void PushMultiple(Stack<ItemType>, Array<ItemType>);
							int main() {
							Stack<int> s;
							PushMultiple(s, 1); // deduction fails
							PushMultiple<int>(s, 1);
							}
							Are the rules for generic different in this area? [There seems to be information related to this in 30.3.2. See that subclause for further comments on this issue.]
									No	

126	14-Jun-04	meeting #5 (WA)	12.1	Technical		Editor	The type long long will be defined by pointing to	Meeting 7 (WA): Steve has produced a revised version, N1693. Editor to fold this in the spec. TG5 understands that WG21 has not yet accepted this paper, but is expected to at its Oct 2004 meeting.	No	
127	14-Jun-04	meeting #5 (WA)	12.3.3	Technical	L	Brandon Bray	Add text to indicate the circumstances under which the modreq IsBoxed shall be emitted (i.e., passing		No	
128	14-Jun-04	meeting #5 (WA)	12.3.6	Technical	L	Brandon Bray	The compiler will need to emit a modopt to distinguish interior_ptr<T> from tracking reference to T (		No	
129	14-Jun-04	meeting #5 (WA)	12.3.7	Technical	L	Brandon Bray	Need to add text to indicate the circumstances under which the modopt IsPinned shall be emitted (i.e.,		No	
130	14-Jun-04	meeting #5 (WA)	14.1.1	Technical	L	Brandon Bray	Separate the list of conversions from the order of preference (such as how Standard C++ separates Sta		No	

	A	B	C	D	E	F	G	H	I	J
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131	14-Jun-04	meeting #5 (WA)	15.3.3	Technical	L	Brandon Bray	Add text to indicate the circumstances under which the following type modifiers shall be emitted, and point to each modifier's definition: • IsBoxed i.e., passing a handle to a value type). • IsByValue (i.e., ref class type passed by value). • IsConst (i.e., pointer or reference to a const-qualified type). • IsExplicitlyDereferenced (i.e., interior_ptr as a parameter). • IsImplicitlyDereferenced (i.e., parameter is a reference). • IsLong (i.e., long/unsigned long/long double parameters). • IsExplicitlyDereferenced (i.e., pin_ptr as a parameter). • IsSignUnspecifiedByte (i.e., plain char's sigedness). • IsUdtReturn (i.e., ref class type returned by value). • IsVolatile (i.e., pointer or reference to a volatile-qualified type).		No	
132	14-Jun-04	meeting #5 (WA)	15.3.10	Technical	M	Brandon Bray	Unboxing and boxing are described as preferred user-defined conversions. Nothing important about th		No	
133	14-Jun-04	meeting #5 (WA)	15.3.10	Technical	L	Brandon Bray	The null value is converted to the null value of the destination type. This can be unverifiable and migh		No	
134	14-Jun-04	meeting #5 (WA)	16.3.3	Technical	L	Brandon Bray	Need to add text to indicate the circumstances under which the modreq IsUdtReturn shall be emitted (		No	
135	14-Jun-04	meeting #5 (WA)	18	Technical	R	Brandon Bray	This table and corresponding sections should include Special Member Functions (SMFs) like destruct		No	
136	14-Jun-04	meeting #5 (WA)	18.2.1	Technical	L	Brandon Bray	Need to address the following: C++/CLI uses the System::Reflection::DefaultMemberAttribute attribu		No	
138	14-Jun-04	meeting #5 (WA)	18.4	Technical		Mark Hall	Need to write up the restrictions on trivial properties.		No	
139	14-Jun-04	meeting #5 (WA)	18.4	Technical	L	Brandon Bray	We probably should say something about the reserved names get_Item and set_Item, and their relation		No	
142	14-Jun-04	meeting #5 (WA)	18.5.3	Technical	L	Brandon Bray	An event with the new modifier introduces a new event that does not override an event from a base cl		No	
143	14-Jun-04	meeting #5 (WA)	18.6	Technical	L	Brandon Bray	The restriction below does not apply to non-static member operators – that need not have a parameter		No	
144	14-Jun-04	meeting #5 (WA)	18.6.1	Technical	L	Brandon Bray	Provide an example for "Homogenizing the candidate overload set".		No	
145	14-Jun-04	meeting #5 (WA)	18.6.5.2	Technical	L	Brandon Bray	Provide C++ names for operator True and False		No	

	A	B	C	D	E	F	G	H	I	J
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148	14-Jun-04	meeting #5 (WA)	20.2	Technical	L	Brandon Bray	Add text to indicate the circumstances under which the following type modifiers shall be emitted, and point to each modifier's definition: • IsConst (i.e., data member involves a cv type). • IsImplicitlyDereferenced (i.e., has a reference type). • IsLong (i.e., long/unsigned long/long double type). • IsSignUnspecifiedByte (i.e., plain char's sigedness). • IsVolatile (i.e., data member involves a cv type).		No	
149	14-Jun-04	meeting #5 (WA)	20.3	Technical	L	Brandon Bray	Add text to indicate the circumstances under which the following type modifiers shall be emitted, and point to each modifier's definition: • IsBoxed i.e., passing a handle to a value type). • IsByValue (i.e., ref class type passed by value). • IsConst (i.e., pointer or reference to a const-qualified type). • IsExplicitlyDereferenced (i.e., interior_ptr as a parameter). • IsImplicitlyDereferenced (i.e., parameter is a reference). • IsLong (i.e., long/unsigned long/long double parameters). • IsExplicitlyDereferenced (i.e., pin_ptr as a parameter). • IsSignUnspecifiedByte (i.e., plain char's signedness). • IsUdtReturn (i.e., ref class type returned by value). • IsVolatile (i.e., pointer or reference to a volatile-qualified type).		No	
151	14-Jun-04	meeting #5 (WA)	24.2	Technical	M	Brandon Bray	The note says "pickup the restrictions from page 333". Brandon, do you have any idea what this page		No	
154	14-Jun-04	meeting #5 (WA)	30.1	Technical	R	Brandon Bray	Doesn't the text "a generic name declared in namespace scope or in class scope shall be unique in that		No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
155	14-Jun-04	meeting #5 (WA)	30.1	Technical	R	Brandon Bray	What is a non-generic type? Does it mean that the rules are the same as classes? As template classes?		No	
156	14-Jun-04	meeting #5 (WA)	30.1	Technical		Editor	Can generic types be nested in native classes?		No	
158	14-Jun-04	meeting #5 (WA)	30.1.1	Technical	R	Brandon Bray	The equivalent wording for template parameters in the working paper has been changed to "defines its		No	
159	14-Jun-04	meeting #5 (WA)	30.1.2	Technical	R	Brandon Bray	30.1.2 says "Like templates in Standard C++, within the body of a generic type any usage of the unqualified unadorned name of that type is assumed to refer to the current instantiation." 30.1.3 then goes on to describe "The instance type". Those seem like to different ways of describing the same concept. Can they be unified in some way?		No	
160	14-Jun-04	meeting #5 (WA)	30.1.6	Technical	R	Brandon Bray	This subclause describes when a static constructor is invoked. In 18.8, it references the CLI Standard Partition II (10.5.3). Are the rules the same? (Yes) Should this subclause also just reference the CLI spec? There are two sets of behavior; we need to say which one we use.		No	
161	14-Jun-04	meeting #5 (WA)	30.1.7	Technical	M	Brandon Bray	What to say about explicit conversion functions (which can only occur in managed class types)?		No	
162	14-Jun-04	meeting #5 (WA)	30.2.2	Technical	R	Brandon Bray	This subclause lists the types that can and cannot be generic arguments. Fundamental types are not in		No	
163	14-Jun-04	meeting #5 (WA)	30.2.4	Technical	R	Brandon Bray	"The non-inherited members of a constructed type are obtained by substituting, for each generic-parameter in the member declaration, the corresponding generic-argument of the constructed type. The substitution process is based on the semantic meaning of type declarations, and is not simply textual substitution." It would be helpful to explain this in more detail and/or give an example where this makes a difference.		No	
165	14-Jun-04	meeting #5 (WA)	30.3	Technical	L	Brandon Bray	Types not used as a parameter type to a generic function cannot be deduced. Are the nondeduced context rules the same as Standard C++ or not? The sentence before this is true, but not complete if the rules are the same as Standard C++.		No	
167	14-Jun-04	meeting #5 (WA)	30.3	Technical	L	Brandon Bray	"When the type of a parameter or variable is a type parameter, the declaration of that parameter or variable shall use that type parameter's name without any pointer, reference, or handle declarators." What about cv-qualifiers?		No	

	A	B	C	D	E	F	G	H	I	J
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168	14-Jun-04	meeting #5 (WA)	30.3	Technical	L	Brandon Bray	Can you take the address of a generic function ins	Meeting #6 (WA): Tentatively decided, NO.	No	
169	14-Jun-04	meeting #5 (WA)	30.3.2	Technical	L	Brandon Bray	The issue raised in 8.15.3 is somewhat answered here. 18.3.6 seems to deal with expanded forms of calls, not expanded forms of function declarations. I interpret the text above as saying that deduction is done as if the function were declared like this: generic <typename ItemType> void PushMultiple(Stack<ItemType>^, ItemType i1, ItemType i2,/* ... */); Is that correct? I think this requires a more detailed description.		No	
170	14-Jun-04	meeting #5 (WA)	30.3.2	Technical	L	Brandon Bray	Something needs to be said about instantiating a generic delegate using a generic function.		No	
171	14-Jun-04	meeting #5 (WA)	30.4.2	Technical	L	Brandon Bray	When are members considered hidden? Is it using the rules described later? Those are described as a		No	
172	14-Jun-04	meeting #5 (WA)	30.4.4	Technical	L	Brandon Bray	Miscellaneous generics issues: 1. I seem to recall discussions of other kinds of constraints (I believe one of them concerned whether you could do a "new T()"). 2. Doesn't there need to be some discussion of how overload resolution works when a function argument has a type parameter as its type? 3. Are the typename and template rules for syntactic disambiguation the same in generics as in templates? Presumably, the lack of specialization would eliminate the need for these. 4. If scope contains a set of overloaded generic functions, is partial ordering used to choose between them? 5. I assume since there is nothing that says otherwise, that generics can be friends of other classes and generics can make other classes, functions, (including generics) friends? 6. If friendship is supported, can a generic first be declared in a friend declaration (suggested answer: no). 7. Standard C++ has restrictions on type parameters such as prohibiting types with no linkage. Does this rule apply to generic arguments? 8. Are there generic conversion functions?		No	
173	14-Jun-04	meeting #5 (WA)	32.1.4	Technical	L	Brandon Bray	To ensure that signatures for the same Type produced by different implementations match, the ordering in such a set of modreqs and modopts is as follows: first modreqs in ascending order by name, then modopts in ascending order by name, with case being significant. [[We need some rule here; is this the one?]].		No	

	A	B	C	D	E	F	G	H	I	J
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174	14-Jun-04	meeting #5 (WA)	32.1.4	Technical	L	Brandon Bray	If IsBoxed is retained for the standard, we have an ordering issue to consider: Currently, the value-typ		No	
175	14-Jun-04	meeting #5 (WA)	32.1.5.1	Technical	L	Brandon Bray	This modifier [IsBoxed] is a workaround for the MS implementation. Does it have any long-term valu		No	
176	14-Jun-04	meeting #5 (WA)	E	Technical	L	Brandon Bray	Flesh out Future Directions		No	
179	23-Jul-04	TG3 liaison		Technical		Mark Hall	Support for Hide-By-Signature on Methods in ref classes	See email thread started by Rex J. on Jul 24. Meeting #6 (WA): Some possible ways to address this (and results of a straw poll) are: 1) Support hidebyname only and issue better error messages. [0 in favour] 2) Make all ref class methods be hidebysig; a. Only [0 in favour] b. Default, with an option to select hidebyname [6 in favour] 3) Add hidebysig keyword to allow explicit marking of methods. [0 in favour] with 3 people unsure. We could go two routes: A) Bring hidebysig in via “using” directive to hoist base class/interface names (this is an approximate solution only, as it doesn't allow hoist-by-signature, only hoist-by-name) [0 in favour] B) Do repeated lookup in all base classes (like C#) [8 in favour] Tom circulated the relevant pages from the CLI spec (Partition I, 7.10.4). We need to take into account the CLS rules when resolving this issue. Meeting #7 (WA): Had a brief discussion. No progress.	No	
182	26-Jul-04	phone meeting		Technical	H	Brandon Bray	Discussion of passing a string literal in the presence of overloads taking String^ and const char * (what about char *?)	Meeting #6 (WA): The compiler currently chooses the String^ over the const char*. Involves type deduction across templates and generics. Reassigned from Mark to Brandon. String literal portion of issue 12 was transferred to #182.	No	
183	2-Aug-04	meeting #6 (WA)		Technical	L	Brandon Bray	Overload assignment operator for handles.	Post-meeting #7. MS design team discussed this and believes that we should drop this issue.	No	

	A	B	C	D	E	F	G	H	I	J
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184	2-Aug-04	meeting #6 (WA)		Technical		Herb Sutter	Describe problem with overloading on % vs. &
							
							Herb presented the following code:
							
							#include <iostream>
							using namespace std;
							void f(const int&) { cout << "f(const int&)" << endl; }
							void f(int&) { cout << "f(int&)" << endl; }
							
							void g(int%) { cout << "g(int%)" << endl; }
							void g(int&) { cout << "g(int&)" << endl; }
							
							int main() {
							const int ci = 0;
							int i = 0;
							int^ hi = gcnew int;
							
							f(ci);
							f(i);
							
							g(*hi);
							// g(i); // ambiguous: should g(int&) be preferred?
							}
							
							The following code was his attempt to write an agnostic swap:
							
							template<typename T>
							void swap(T% a, T% b) {
							#if defined NO_PIN_PTR // doesn't work
							T temp = a; a = b; b = temp;
							#elif defined PIN_PTR_BUG // doesn't compile
							T temp = *pin_ptr<T>(a);
							*pin_ptr<T>(*pa) = *pin_ptr<T>(*pb);
									No	

185	2-Aug-04	meeting #6 (WA)		Technical		Herb Sutter	Collapsing reference to reference. (It's in the C++0x spec.)		No	
186	2-Aug-04	meeting #6 (WA)		Technical	L	Brandon Bray	Should we standardize traits?		No	
188	2-Aug-04	meeting #6 (WA)		Technical	H	Brandon Bray	Look at using + to implement String concatenation.		No	
189	2-Aug-04	meeting #6 (WA)		Technical		??	Look at the changes to the grammar for C++0x and note where they affect the C++/CLI grammar.		No	
191	2-Aug-04	meeting #6 (WA)		Technical	M	Brandon Bray	Review the specification checking the usage of accessibility vs. visibility		No	
192	2-Aug-04	meeting #6 (WA)		Technical	L	Brandon Bray	Provide an annex containing the differences between the grammar of Standard C++ and C++/CLI		No	
193	2-Aug-04	meeting #6 (WA)		Technical		Sean Perry	Look at the issue of whether or not the mapping of bool should be implementation-defined.	Meeting 7 (WA): Sean wrote this up and presented it to the full committee on the 2nd day. Based on committee feedback, Sean will revise his paper for future consideration.	No	

	A	B	C	D	E	F	G	H	I	J
1	**Date Raised?**	**Issue Raiser?**	**Reference**	**Issue Type**	**Priority**	**Owner**	**Comment**	**Other Remarks**	**Resolved?**	**Postponed?**
194	2-Aug-04	Anthony Williams	15.3.2	Technical		Jonathan Caves	Re Anthony's post to the reflector re "default index	Meeting 7 (WA): Discussed the possibility of disallowing both the default indexed property and operator[].	No	
195	25-Aug-04	Rex Jaeschke	14.1.	Technical	L	Brandon Bray	Separate the list of conversions from the order of preference (such as how Standard C++ separates Standard Conversions from overload resolution).		No	
196	30-Sep-04	meeting #7 (WA)		Technical		Herb Sutter	In native types, % behaves like &.		No	
198	30-Sep-04	meeting #7 (WA)	2	Technical		Tom Plum	Propose wording to require that extensions over and above ISO C++ requirements, be diagnosed.		No	

Minutes of the: *7th meeting of Ecma TC39-TG5*
held in: *Redmond, WA, USA*
on: *20-21 September, 2004*

Rex Jaeschke
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2004-09-21

1 Opening

Convener Tom Plum welcomed everyone to the seventh meeting of TG5.

1.1 Appointment of Recording Secretary

Rex Jaeschke was appointed.

1.2 Introduction of participants

The participants introduced themselves. Those attending were: Steve Adamczyk(EDG), Jonathan Caves (Microsoft), Jan van den Beld (Ecma), Mark Hall (Microsoft), Rex Jaeschke (Microsoft), Jon Jagger (Jagger Software Ltd), Toshiaki Kurokawa (CSK Corp.), Sean Perry (IBM), P.J. Plauger (Dinkumware), Tana Plauger (Dinkumware), Tom Plum (Plum Hall), and Herb Sutter (Microsoft).

1.3 Host facilities/local information

Local information was provided.

2 Adoption of the agenda

Document 2004-35 was approved without objection.

3 Approval of Minutes of previous TG5 meeting

Documents 2004-29 (phone call) and 2004-32 (August face-to-face) were approved without objection.

4 Matters arising from the minutes not covered elsewhere

None.

5 Project Editor's Report – Rex Jaeschke

Rex presented document 2004-37.

The committee agreed in principle with item 6 (re a conforming implementation's being required to generate CLS-compliant metadata as much as possible); however, rather than incorporating this in normative text, we should simply use this as a guiding principle in our deliberations and when producing text to be included in the draft.

6 Approving tracked changes in latest draft

Document 2003-34. The document was approved with a number of editorial changes. The following issues were raised:

11.1: In “If this pre-defined macro name is the subject of a `#define` or a `#undef` preprocessing directive, the behavior is undefined”, TG5 agreed to change “undefined” to “implementation-defined”.

12.1: The places that say that bool is 8 bits and maps exactly to System::Boolean should be marked with Comments saying that this is under review per issue #193.

18.3.1: The statement that “A program containing an implicitly overridden function in ref classes and value classes is ill-formed.” seems to be contradicted by the new first example that follows it.

18.4.4: This subclause states: “Private backing storage for a trivial scalar property is automatically allocated with the name of that storage being unspecified, but in the implementer’s namespace.” Why is this unspecified? If the intent is for a conforming implementation to generate CLS-compliant code, or at least code that other conforming C++/CLI implementations can handle, should we expose/require the spelling of the name used?

18.9: At first glance, it appears that System::String is not allowed as the type for a literal field. However, handles really are scalar types. Clarify that String^ really is allowed here, especially since the example in the metadata subclause uses it.

18.10.3: Editor to extend the example to show that the explicit assignment of v1 is handled at runtime in the static constructor. Basically, show the corresponding instance and static constructors as well.

19.1: This new feature (allowing member function in a native class to be generic) was inadvertently introduced as an editorial change. Mark this as a Comment. Editor will add it as a new issue in the spreadsheet.

25.3: TG5 decided to outlaw enumerators called value__. Although identifiers containing two consecutive underscores are already reserved for implementer’s use, this case was deemed sufficiently important that it should be called out.

30.1: Re the overloading on arity, the editor was asked to add words describing the case in which the names came from different namespaces.

H.1: It was decided that H1’s body be replaced with a statement along the lines of “The committee determined to not introduce any new undefined behaviors beyond those already in the C++ Standard.” (The actual text in H1 did not actually belong there as it was not new behaviour, but simply a quote from the C++ Standard.)

Action: Tom will propose wording to require that extensions over and above ISO C++ requirements, be diagnosed.

It was proposed that that the special space separator ␣ (as is used in the grammar in `ref␣class`, for example) be used in the narrative as well as in the grammar. The final decision was to not do so.

The editor proposed that relatively simple descriptions of metadata generation requirements be added to the draft, along with relevant examples (as shown in 25.3 and 26.4). TG5 agreed with this. Although implementers will have to refer to the CLI standard, it was seen as useful to specify more metadata information in the C++/CLI specification than what might be minimally required.

The editor proposed that instead of placing metadata information in-line, scattered throughout the narrative, that it all be put in one normative annex, and be pointed to from the earlier clauses. One exception was that the metadata discussion on modopts and modreqs would stay in clause 32. TG5 agreed.

Action: Rex to liaise with TG3 re whether or not read/write properties whose getter and setter have different accessibilities can be CLS-complaint. (Currently, CLS Rule 25 requires that the accessibility of a property and its accessors be identical.)

7 Date and place of next meetings

7.1 Next Meeting

October, 2004. Redmond, WA; hosted by Microsoft.

10/22, Fri pm: TG5 (immediately following WG21)
10/23, Sat, all day: TG5

7.2 Future meetings (and progress timeline)

December, 2004: Tentative face-to-face meeting cancelled; telcon only, as needed.

Dec 30, 2004, is the cut-off date for contributions of all non-trivial issues.

Jan 7, 2005, editor will circulate a new draft.

Jan 8-19, 2005, all TG5 members will perform a detailed review

January 20-21, 2005: Westfield NJ; hosted by EDG and Dinkumware

March 8-9, 2005: Big Island, Hawaii; hosted by Plum Hall
(and, if needed, 1 hour at 9 am on May 11 to review work done post-main meeting)

Vote the spec out of TG5 and then forward to the GA via the TC39 business meeting, to be held the afternoon of March 11.

8 Reports from Liaisons

8.1 TC39 TG3 (CLI) – Rex Jaeschke

TG3 has agreed that all standard delegates must have the methods BeginInvoke and EndInvoke. TG5 spec now requires these be generated for all delegates.

W.r.t the modopt and modreq and types, their assembly is mscorlib, and their namespace is System::Runtime::CompilerServices.

Rex reported that TG3 is currently reviewing 6 new CLS rules, which are intended to address generic types and functions.

Rex reported that the planned support for the soon-to-be-forthcoming IEEE 754r decimal floating-point representation for System::Decimal, and the corresponding attribute for Decimal literals, is nearly complete.

Rex briefly mentioned that TG3 is working with the Compact Framework folks to determine what changes, if any, might need to be made to the CLI specification, for embedded systems.

8.2 SC22/WG21 (C++) – Tom Plum, P.J. Plauger, Tana Plauger, John Spicer, and Steve Adamczyk.

8.2.1 Tracking WG21 evolution changes

All outstanding issues have been completed. We'll continue to monitor WG21 activities and report back, as needed.

8.2.2 Any other WG21 liaison issues

None.

8.3 TC39 TG2 (C#) – Tom Plum

Tom discussed his experiences with the `Nullable<T>` type in the Beta 1 product, and C++/CLI. `Nullable<T> x = nullptr` and `x == nullptr` do not compile. After some discussion is was agreed that these situations could be handled via a default constructor and `operator==` overloading.

Action: Tom to verify that `Nullable<T>()` represents the unassigned value.

9 Action item and comment spreadsheet review

A walk-through took place with several issues being closed or re-assigned.

#43 (handles and ==):

In the case of `if(handle)`, which conversions are attempted before comparison against `nullptr` is used?

We agreed that if an explicit conversion to bool exists, `if(handle)` uses that.

There is no implicit unboxing.

Steve and Mark worked on this and presented it to the full committee on the 2nd day.

Action: Based on committee feedback, Mark will write this up for future consideration.

#97 (overloading on arity): Herb reported that the MS implementation can consume same-named generics that overload on arity in the same assembly, but it cannot create them.

#105 (constructors, managed classes, and explicit conversions):

Steve and Mark worked on this and presented it to the full committee on the 2nd day.

Action: Based on committee feedback, Mark will write this up for future consideration.

#106 (handling of >> as two tokens): Daveed provided document N1699, a revised version of his paper. This topic is on the agenda of the up-coming WG21 meeting, in which TG5 members will participate.

#120 (typename and elaborated specifiers): TG5 decided to drop this issue.

#123 ("constructed type" vs. "instantiation"): Chose to use "constructed type". No change needed to the draft.

#124 (Issues re indexed properties): Jon Caves gave a presentation that involved the following examples:

```
property int Value[int] {
  void set(int, int);
};

x->Value[1] = 4
is treated as
x->set_Value(1,4);

----------------

property array<int>^ Value {
   array<int>^ get();
}

x->Value[1] = 4
is treated as
x->get_Value()[1] = 4

---------------------

property int% Value[int] {
   int% get(int);
}

x->Value[1] = 4
```

is treated as
x->get_Value(1) = 4

This construct violates the principle of properties (that of setting/getting the value of some property), so is not to be encouraged; however, it is supported, but no need to consider it further here.

The proposed solution is

x-Value[e] = v
is treated as
x->Value::set(e,v)

However, a getter that returns an array gets special treatment.

Jon wrote this up and presented it to the full committee on the 2nd day.

Action: Based on committee feedback, Jon will revise his paper for future consideration.

#179 (Hide-By-Signature support): Had a brief discussion. No progress.

#193 (mapping of bool to System::Boolean): Sean wrote this up and presented it to the full committee on the 2nd day.

Action: Based on committee feedback, Sean will revise his paper for future consideration.

#194: TG5 discussed the possibility of disallowing both the default indexed property and operator[].

10 Any other business

10.1 Distribution of docs to WG21:

Action: Editor will distribute to the TG5 reflector, WD1.7, so members can make it available on their websites for access by WG21 members. Editor will also announce this availability to the liaison email reflector.

Action: Editor will concatenate the PDFs of all docs (except WD1.7) to WG21, and forward to Herb for distribution. (This package will include these draft minutes after TG5 has had a change to review and correct them via email.) This packet will include a document containing URLs from which the latest draft can be obtained.

10.2 Thank meeting host:

Everyone thanked meeting host Microsoft.

11 Adjournment

The meeting was adjourned at 4 pm.