Keep alias syntax extendable

Tomasz Kamiński

Pricinpal Software Developer, Sabre

30 października 2017

Problem statement

Result of the P06340

Alias declaration syntax is restricted to type aliases only:
using *id* = *other-id* ;

Proposal

Revert P06340 changes to alias-declaration syntax, and thus unblock further extensions.

Use case 1: Importing a function

Goal

Make invocation of the function Y::foo equivalent to X::foo.

Solution

```
namespace Y
{
  using X::foo;
}
```

Use case 2: Importing a function

Goal

Make invocation of the function Y::bar equivalent to X::foo.

Solution 1

```
namespace Y
{
   template<typename... Args>
   decltype(auto) bar(Args&&... args)
   { return X::foo(std::forward<Args>(args)...); }
}
```

Use case: Importing a function

Goal

Make invocation of the function Y::bar equivalent to X::foo.

Solution 2

```
namespace Y
{
   template<typename... Args>
   auto bar(Args&&... args)
      noexcept(X::foo(std::forward<Args>(args)...))
   -> decltype(X::foo(std::forward<Args>(args)...))
   { return X::foo(std::forward<Args>(args)...); }
}
```

Use case: Importing a function

Goal

Make invocation of the function Y::bar equivalent to X::foo.

Solution 2: Using P0573R2

```
namespace Y
{
  template<typename... Args>
  auto bar(Args&&... args)
  => decltype(X::foo(std::forward<Args>(args)...))
}
```

Use case: Importing a constrained function

Goal

Make invocation of the function Y::bar equivalent to X::foo.

Declaration

```
namespace X
{
  template<C1 T1, C2 T1>
  void foo(T1 t1, T2 t2);
}
```

Solution 3

```
namespace Y
{
  template<C1 T1, C2 T1>
  void bar(T1 t1, T2 t2)
  { return X::foo(std::move(t1), std::move(t2)); }
}
```

Use case: Non-movable argument

Goal

Make invocation of the function Y::bar equivalent to X::foo.

Declaration

```
namespace X
{
  void foo(NonMovable nv);
}
```

Solution 4

```
namespace Y
{
  void bar(NonMovable nv)
  { return X::foo(std::move(nv)); }
  //compilation error
}
```

Use case: Example extension

Goal

Make invocation of the function Y::bar equivalent to X::foo.

Extension

```
namespace Y
{
  using bar = X::foo;
}
```

Discussion

Statement

Programmer should be able to differentiate what kind of entity is imported - syntax should be different for templates, functions, variables and types.

Counterargument

Syntax of importing should not differ if X::foo is:

- normal function
- function template
- set of overloaded functions
- set of overloaded function templates
- set of overloaded functions and function templates
- global functor variable

Discussion

Statement

Programmer should be able to differentiate what kind of entity is imported - syntax should be different for templates, functions, variables and types.

Counterargument

The other usages of **using** keyword in the language does not differentiate between type of entities.

Discussion

Statement

Programmer should be able to differentiate what kind of entity is imported - syntax should be different for templates, functions, variables and types.

Counterargument

typename keyword already makes intent clear:
using *type* = **typename** *other-type*;