Private Names and At-names


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Unique/Private Names

• Unique and private names (aka symbols) are ES6’s solution for objects that need to expose properties that have limited or controlled accessibility.

• Currently no syntactic support for definition or use.

```javascript
const secret = Name();
let obj = {};
obj[secret] = 42;
```
Basic Problem

• The current imperative code patterns for using names don’t mesh well with declarative object/class definitional forms.

```javascript
const secret = Name();
let obj = {secret: 42};  // does not define an
// unique name properties

Class MyClass extends Another {
    secret() {this.mine(); super[secret]()}
}  // secret is a regular property string key
// when used as method name but evaluated
// to a name when used within [ ]
```
Some ES6 features are only available using declarative forms.

- Current no way to define a method that has a unique/private property name and references `super`.

```javascript
const secret = Name();
//class MyClass extends Another {
//    secret() {this.mine(); super[secret]() }
//}
// secret is a regular property string key

//The following is currently illegal:
class MyClass extends Another {...};
MyClass.prototype[secret] =
    function () {this.mine(); super[secret]() }
```
Computed Property Names for Object Literals Were Abandoned

const secret = Name();
let obj = {[secret]: 42}; // does not define an
// unique name properties

Class MyClass extends Another {
  [secret]() {this.mine(); super[secret]()}
}

• Issues
  – Allowed arbitrary expr. in prop name def. position
  – Allowed aliasing of string valued prop keys
  – Permitted same key to occur more than once
  – Future hostile: ties property def. to indexing syntax
Also, some minor convenience issues

• Forced to use [ ] rather than . for name-based property accesses.
  – Hostile to future adoption of an extension model for [ ].

• Forced to explicitly call the Name constructor to create a new unique or private Name object.
At-Names

• An At-name is an IdentifierName that is lexically prefixed with @
• At-names are const bound to Name values by new declaration forms:

    name @x, @y;
    private @secret;

• Such declarations implicitly create new Name objects.
• Normal lexical scoping rules.
• No cross-talk between an At-name and a non-At-name binding of the same base IdentifierName
• “name” is a contextually reserved word: first token of statement and followed by an At-name
• **name/private** declarations make it unnecessary to expose the Name constructor objet.
At-Name References

• At-names can appear in any context where an IdentifierName would be interpreted as a literal property name.
  – As a property name in object literals/class definitions
  – After . in MemberExpressions

• Lexical scoping rules resolve such At-name references to a Name object value.

```javascript
private secret;
let obj = {@secret: 42};

Class MyClass extends Another {
   @secret() {mine(); super.@secret()}
}
```
At-names in Primary Expressions

- When used as a Primary expression, an At-name simply lexically resolves to the visible const name binding of the At-name.

```javascript
obj.@secret;
obj[@secret]
;  // mean the same thing

let f = (o,k) => o[k];

// At-name values assignable to normal bindings
f(@secret);  // o[k] === o[@secret] === o.@secret
```
Name declarations with initializers

• In a name/private declaration, each At-name may have an initialization expression.

  private @secret = NameBroker.provideName(secretCode);

• The initializer must evaluate to a name object.
• The primary use case is initializing an At-name to a name provided via a function call or other computed value
Optional Feature – Class-scoped name declarations

• Allow name/private declarations to occur as a class body element.
• Any such declared At-names are scoped to the class body.

```javascript
class Point {
    private @x, @y; // <=== scoped to class body
    get x() {return this.@x}
    get y() {return this.@y}
    constructor (x,y) {
        this.@x = x;
        this.@y = y;
    }
};
```
Optional Future Feature – Class-scoped protected name declarations

• Allow “protected” declarations to occur as a class body element.

• Any such declared At-names may be explicitly imported into subclass body scopes.

```java
class Point {
    protected @x, @y;
    constructor (x,y) {
        this.@x = x;
        this.@y = y;
    }
};
class Point3D extends Point {
    protected @x, @y, @z;
    constructor (x, y, z) {
        this.@x = x;
        this.@y = y;
        this.@z = z;
    }
};
```

• Inherited protected at-name values are dynamically determined at class initialization time.
• Explicit declaration of inherited at-names avoids open with-like scoping issues.
Proposal for ES6

• Add At-names and **name/private** declarations
• At-names as properties keys supported in object literals and class bodies.
• Allow aliasing of unique/private names via initializers in **name/private** declarations
• Also allow **name/private** declarations to occur in class bodies.
• Added at meeting: name/private declarations in obj literals. Also private/name as prefix.
• Continue to explore future support for **protected**.