

Squawk – Status Update

Doug Simon



Sun Microsystems Laboratories

#1

Squawk Technology



What's new

- Loader
 - Real numbers
 - Optimized memory usage
- New String implementation



Loader



Sun Microsystems Laboratories

#3

Squawk Technology

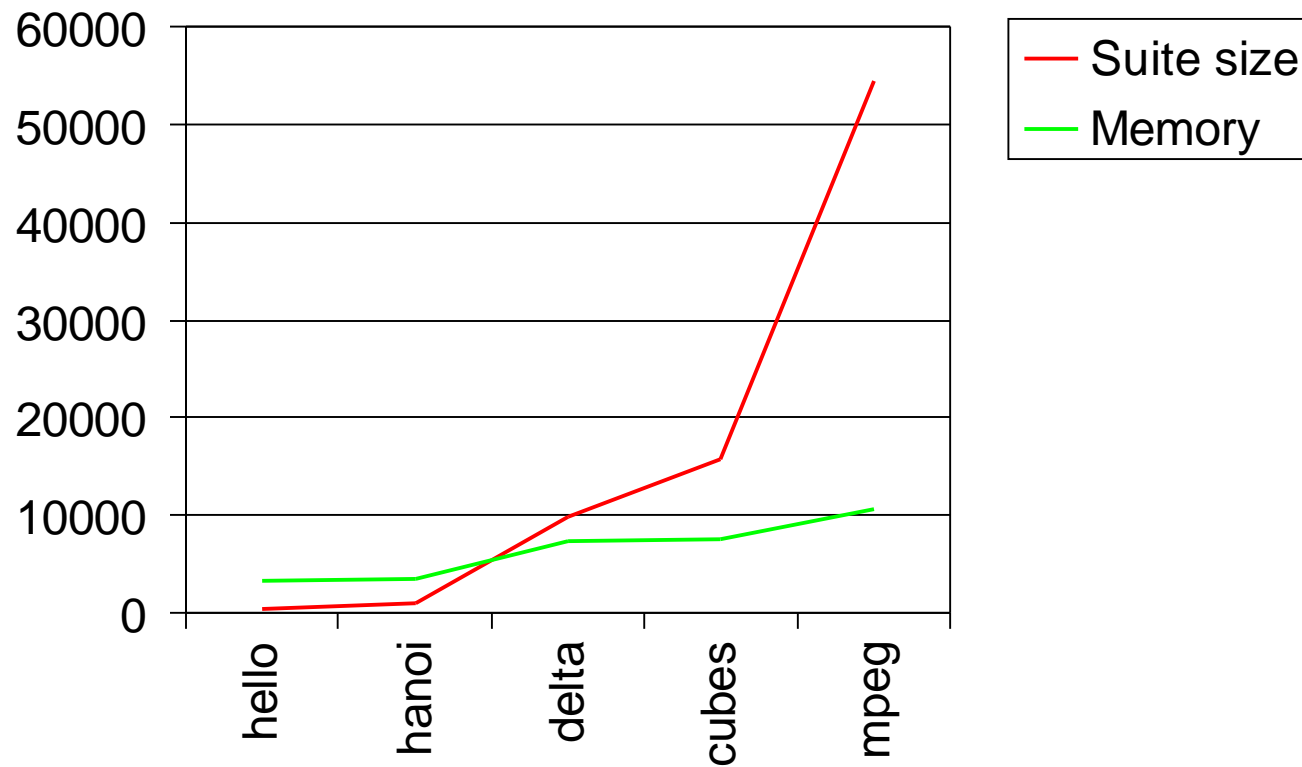


Benchmarks

	helloworld	hanoi	delta	cubes	mpeg
Methods & Fields	7	18	159	219	362
Bytecode (in bytes)	23	243	3214	9767	42997
Suite (in bytes)	448	1117	9737	15848	54487
Dynamic memory (in bytes)	3276	3500	7288	7664	10680



Loading memory requirements



New String implementation



Sun Microsystems Laboratories

#6

Squawk Technology



Old implementation

```
public final class String {  
  
    private char value[];  
    private int  offset;  
    private int  count;  
  
    // methods  
}
```



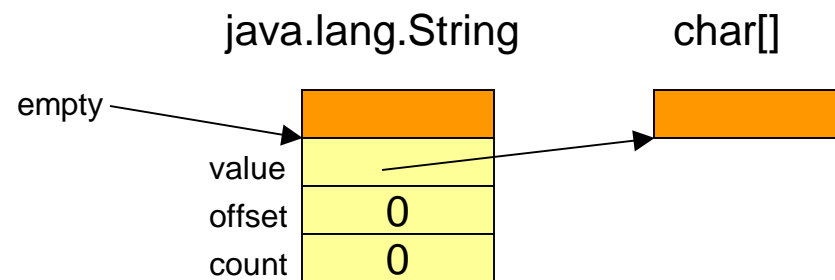
New implementation

```
public class String {  
    // methods  
}  
  
public class StringOfBytes extends String {  
}
```



Empty string (old)

String empty = "";




16 bytes + 4 bytes = 20 bytes



Empty string (new)

```
String empty = "";
```

java.lang.StringOfBytes

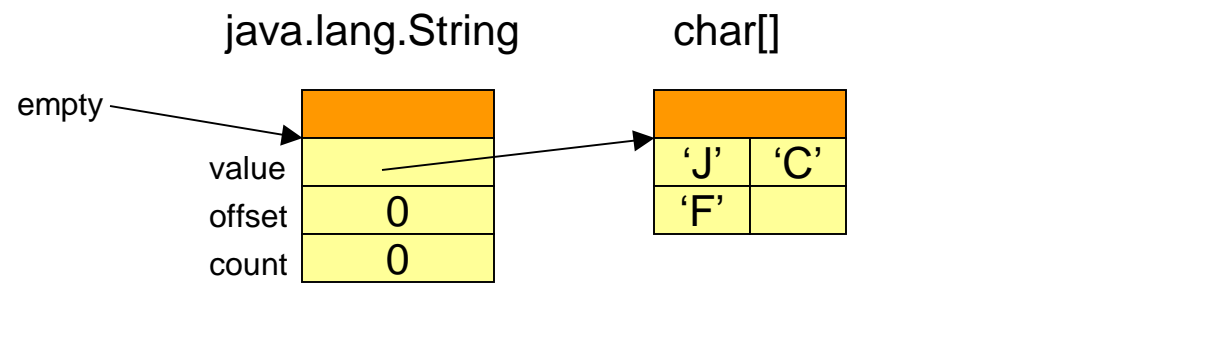
empty → 

4 bytes



Non-empty string (old)

String name = "JCF";



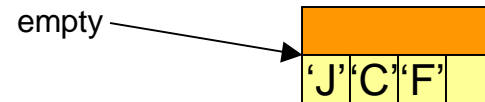
16 bytes + 12 bytes = 28 bytes



Non-empty string (new)

String name = "JCF";

java.lang.StringOfBytes



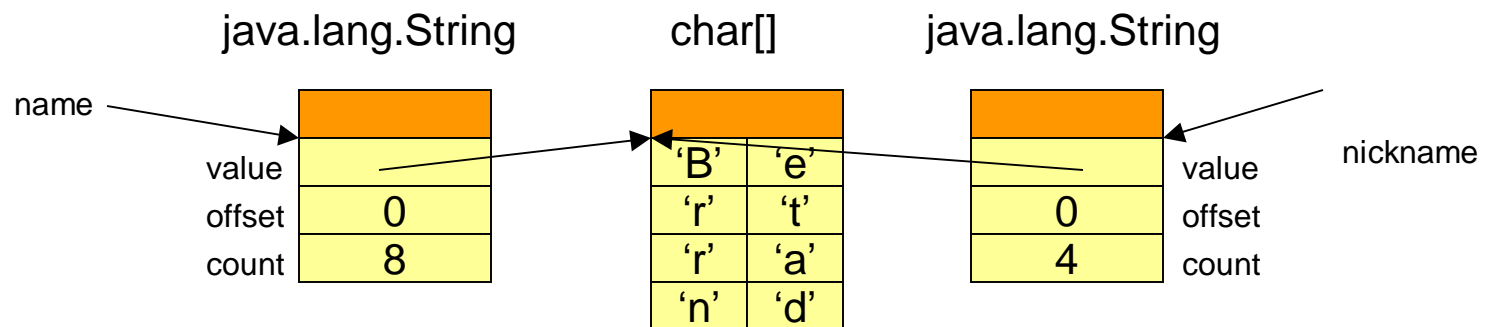
8 bytes



Substring (old)

```
String name = "Bertrand";
```

```
String nickname = name.substring(0, 4);
```



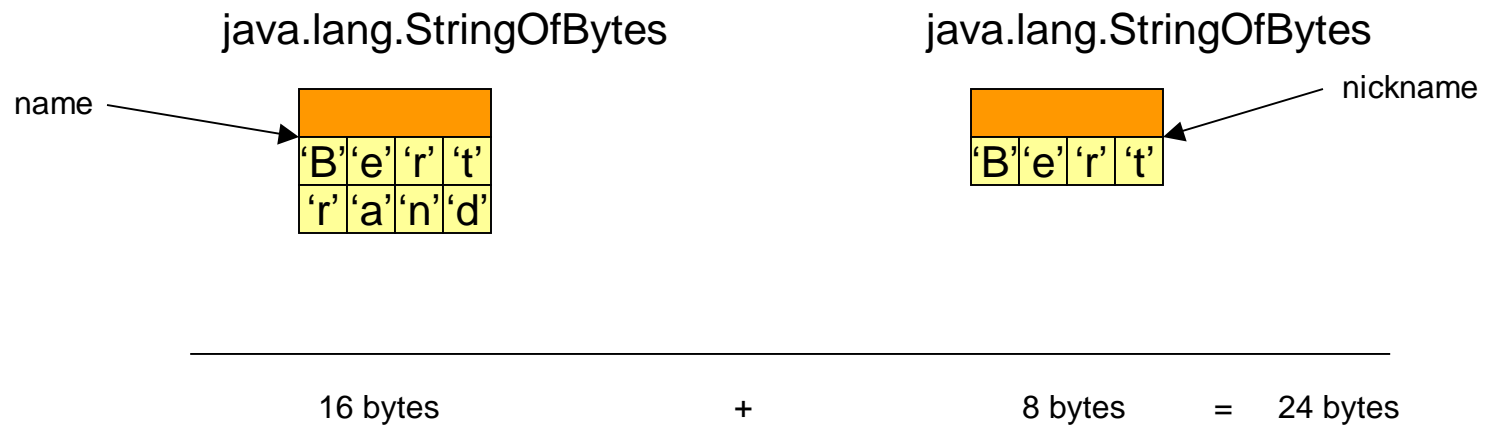
16 bytes + 20 bytes + 16 bytes = 52 bytes



Substring (new)

```
String name = "Bertrand";
```

```
String nickname = name.substring(0, 4);
```



Details

- String instances are arrays internally (bytes or chars).
- Only 3 non-byte array strings in Squawk:
 1. Tables describing instructions properties encoded as char arrays
 2. Wrapped in a String for immutability
- Does not impact String interning

