
NIAGARA
SUMMIT
2026
SEAMLESS CONNECTIVITY,
POWERFUL INTELLIGENCE
TRIDIUM

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RESTRICTING ACCESS TO FROZEN SLOTS

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Security Coding Concept: Access

- Who can run your code
- What they can do with it
- Why this matters for Niagara

Access in Niagara

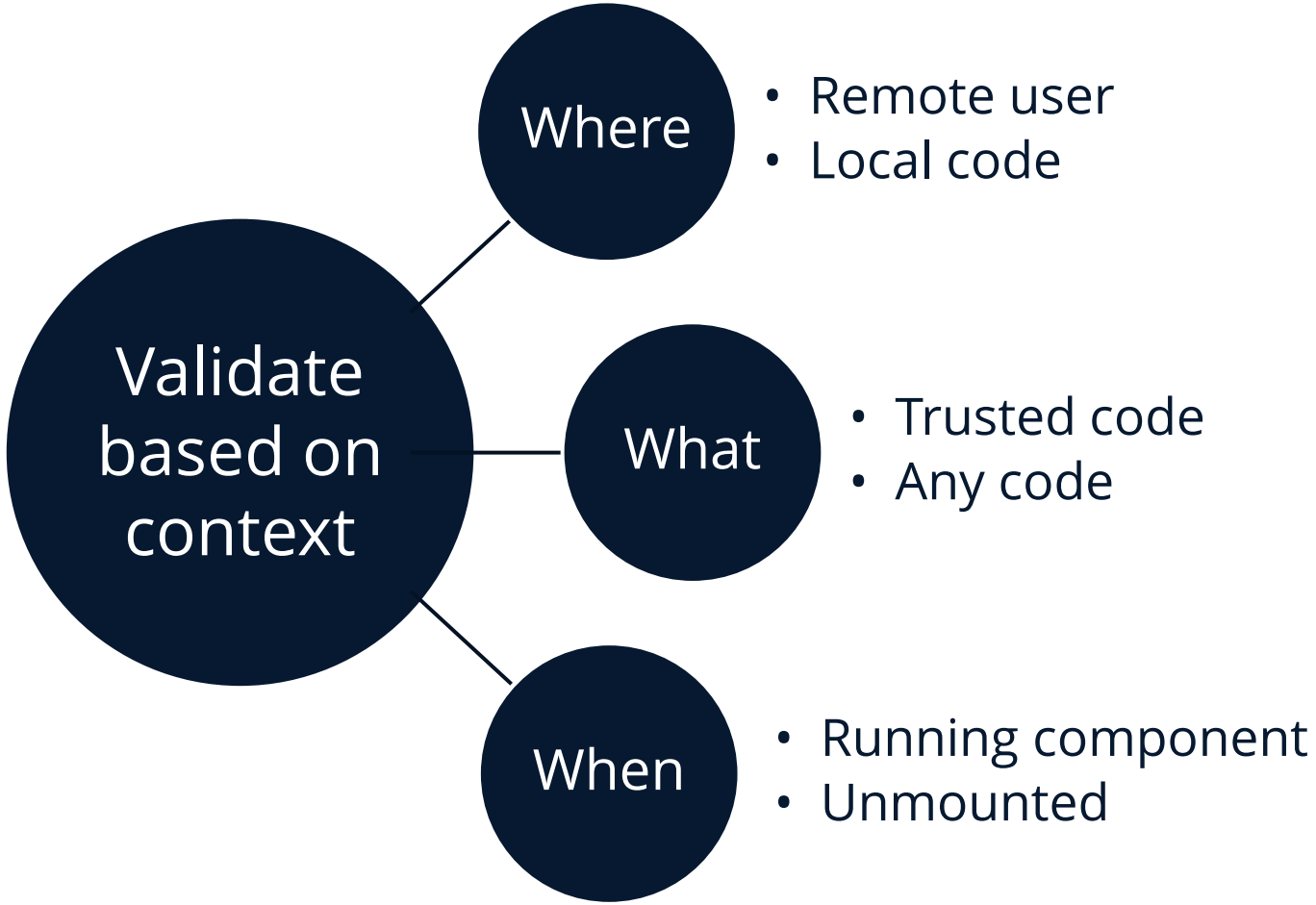
Niagara is a framework

Slots are public

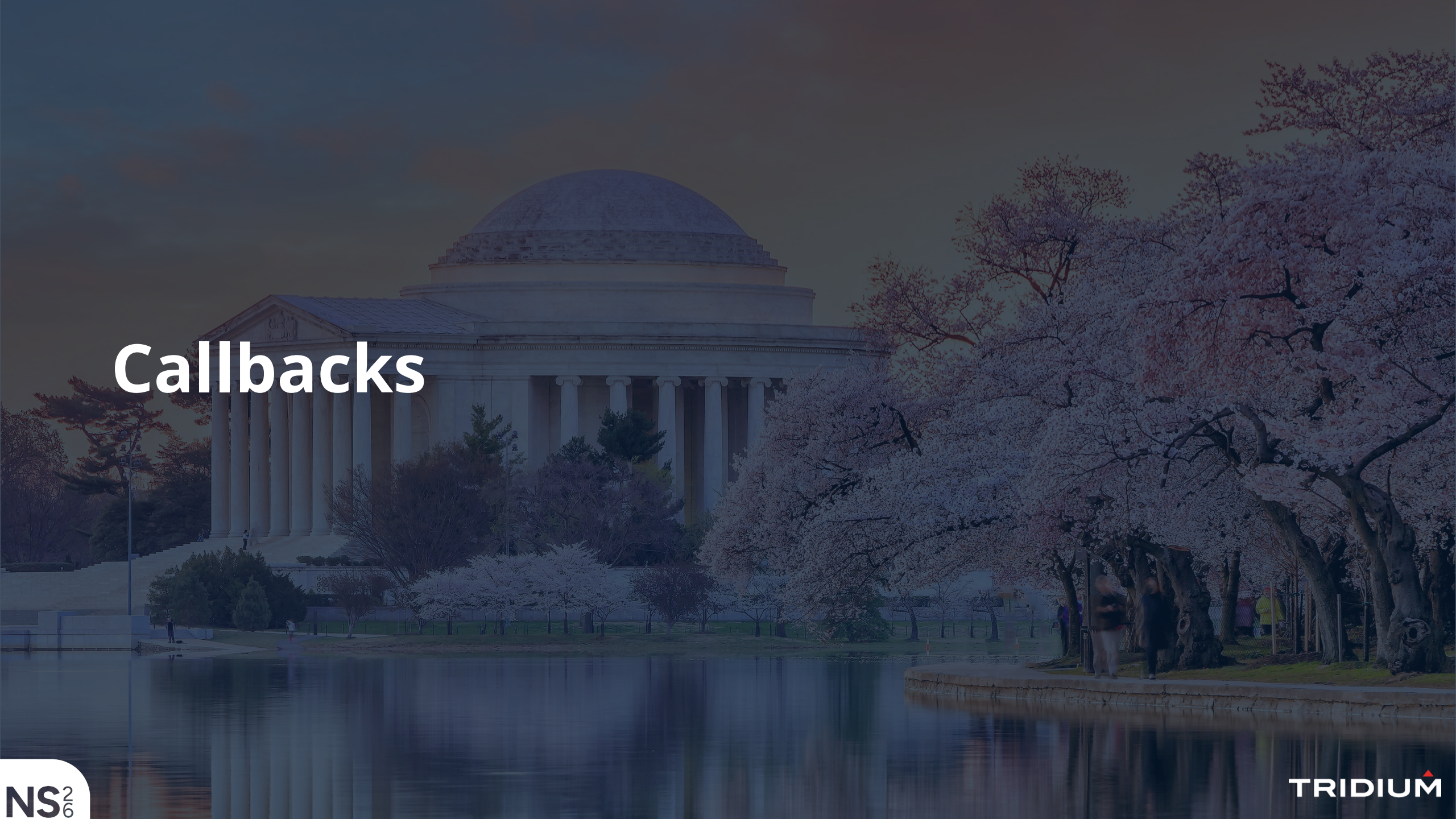
Desired Slot Behavior

- Read-only
- Allows links
- Invocation permissions
- Critical to functionality

BIFrozenSlotContextValidator



Callbacks



BIFrozenSlotContextValidator

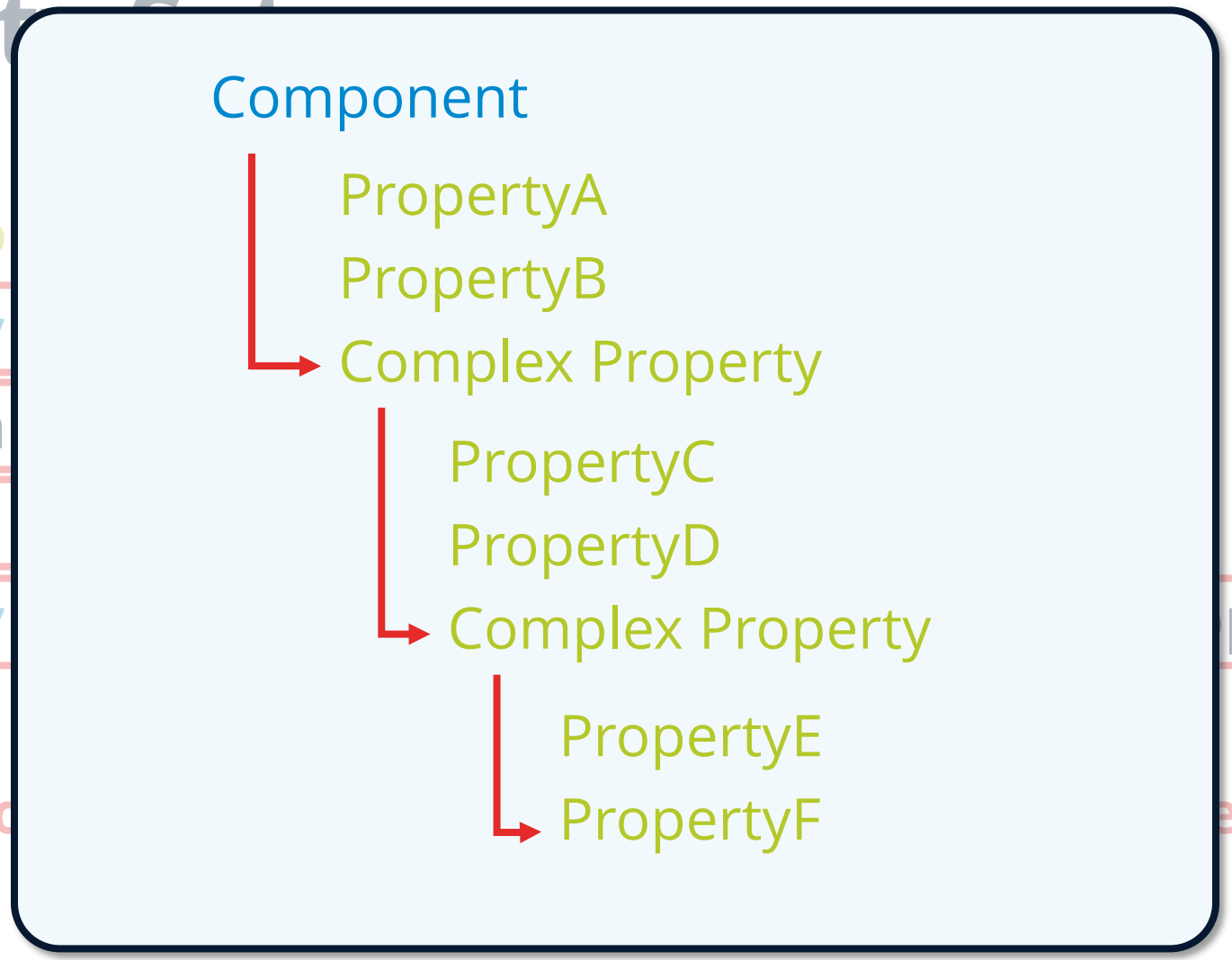
```
default void validateContextForPropertySet(…)

default void validateContextForActionInvocation(…)

default void validateContextForTopicFire(…)
```

```
default Set<String> getTrustedModulesForSlotOperations(Slot slot)

default boolean trustSubclassesForSlotOperations(Slot slot)
```


Component
PropertyA
PropertyB
Complex Property
PropertyC
PropertyD
Complex Property
PropertyE
PropertyF

Topic Fires

```
default void validateContextForTopicFire(
    Topic topic,
    BValue eventArg,
    Context context,
    Property... pathToDescendantContainingTopic)
{
}
```

Action Invokes

```
//region /*+ --------- BEGIN BAJA AUTO GENERATED CODE --------- +*/
…
@Generated
public void myAction() { invoke(myAction, null, null); }
…
//endregion /*+ --------- END BAJA AUTO GENERATED CODE ----------- +*/



…


public void doMyAction()
{
  validateContextForActionInvocation(…)
  // Do some work
}
```

Convenience Methods

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Running Station

```
static void checkActiveStationOperation(
  BComplex complex,
  Slot slot,
  Context context,
  Property... pathToDescendantContainingSlot)
{
}
```

Only allows the operation if the complex is mounted in a running station

Running Station - Example

```
public void updateStatus()
{
   if (!checkLicense())
   {
      setStatus(BStatus.FAULT);
   }
}
```

Protect the ‘status’ property with `checkActiveStationOperation()`

Remote User Operations

```
static void checkRunningAndRemoteUserOperation(...)
```

Mounted in a running station
Initiated by a remote user

```
static void checkNotRunningOrRemoteUserOperation(...)
```

Not mounted in a running station

Remote User Operations - Example

```
public final void doUpdatePassword(
    char[] oldPassword,
    char[] newPassword,
    Context context
)
{
    // Do some validation
    setPassword(BPassword.make(newPassword));
}
```

Protect the 'updatePassword' action with `checkRunningAndRemoteUserOperation()`

Local Code Operations

```
static void checkRunningAndNonRemoteUserOperation(...)
```

Mounted in a running station
NOT initiated by a remote user

```
static void checkNotRunningOrNonRemoteUserOperation(...)
```

Not mounted in a running station

Local Code Operations - Example

```
public void loginFailed()
{
   auditLoginFailure()
   if (numFailures >= maxNumFailures)
      setLockout(true);
}
```

Protect the 'lockout' property with `checkNotRunningOrNonRemoteUserOperation()`

Module-Scoped Operations

```
static void checkSlotOperationCalledByOwnerOrFramework()
```

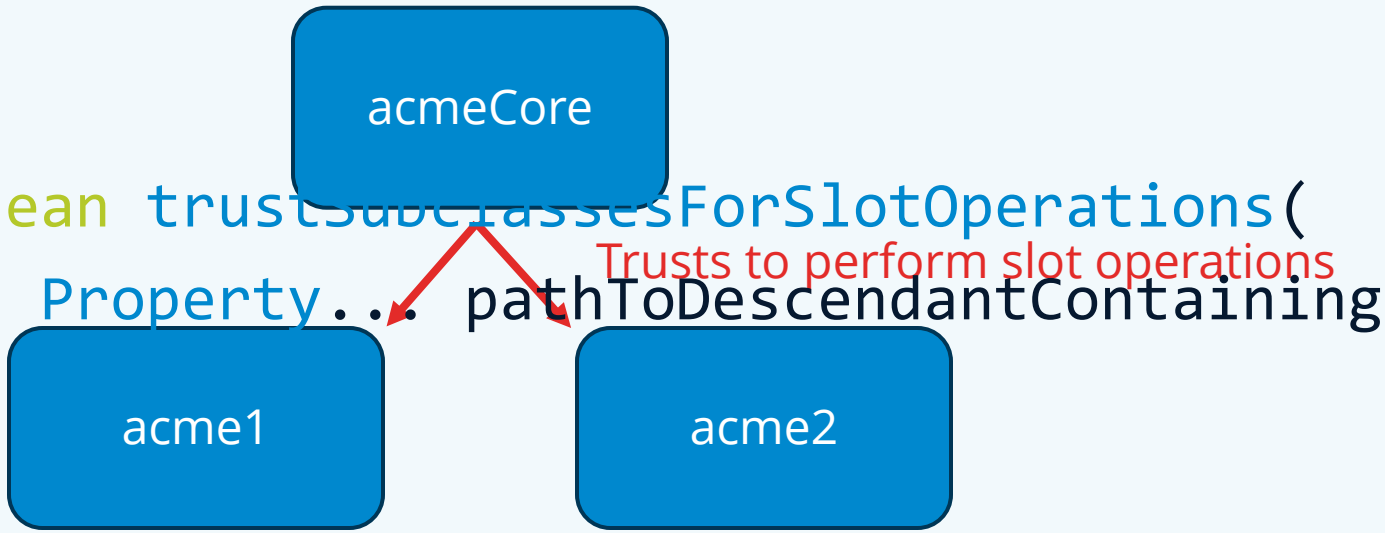
Initiated by the module that owns the slot

Initiated by other specified trusted modules

Module Scoped Operations

```
public interface BIFrozenSlotContextValidator
{
  default Set<String> getTrustedModulesForSlotOperations(
    Slot slot, Property... pathToDescendantContainingSlot
  )

  default boolean trustSubclassesForSlotOperations(
    Slot slot, Property... pathToDescendantContainingSlot
  )
}
```



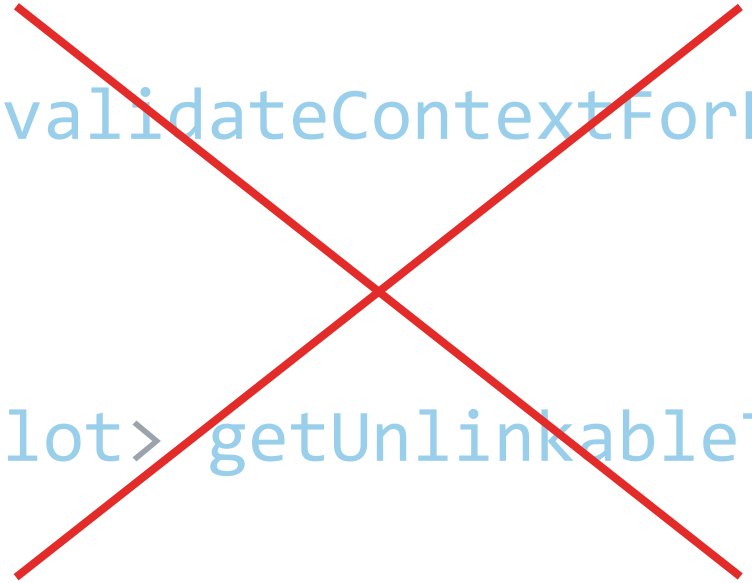
Read-Only Property Implementation

BIReadonlyProperty Container

- True read-only
- Not editable by users
- Not editable by code

BIReadonlyPropertyContainer

```
default Set<Property> getPropertiesToProtect()
```



```
default void validateContextForPropertySet(…)
```

No need to override unless you're making it final

```
default Set<Slot> getUnlinkableTargetSlots(…)
```

BIReadonlyPropertyContainer

```
Set<Property> getPropertiesToProtect()
```

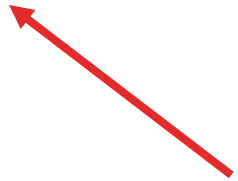
Defaults to properties with READONLY flag

Can be overridden

Make it final!

Preventing Permission Exceptions

```
public void loginFailed()
{
   auditLoginFailure()
   if (numFailures >= maxNumFailures)
      setLockout(true);
}
```



Will trigger a permission check due to `checkSlotOperationCalledByOwnerOrFramework()`

Preventing Permission Exceptions

```
public void loginFailed()
{
  auditLoginFailure()
  if (numFailures >= maxNumFailures)
  {
    SecurityUtil.doPrivileged((PrivilegedAction<Void>)() -> {
      setLockOut(true);
      return null;
    });
  }
}
```

Preventing Permission Exceptions

```
setLockout(true)
```

```
set(lockout, true)
```

```
set(“lockout”, true)
```

Thank you!