Akademy

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Input Handling Update

What's Coming Up in Qt 6

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ecloud on #qt-labs, #qt-quick etc.

About me

- Qt user since ~2004
- The Qt Company - Oslo since 2011
- Pointing devices: touch, Wacom tablets
- Linux/X11 and macOS
- QtPDF
- Qt Quick, Controls and Dialogs

Agenda

- Goals
- API changes
- Qt Quick
- Demos
- Remaining work
- Q&A

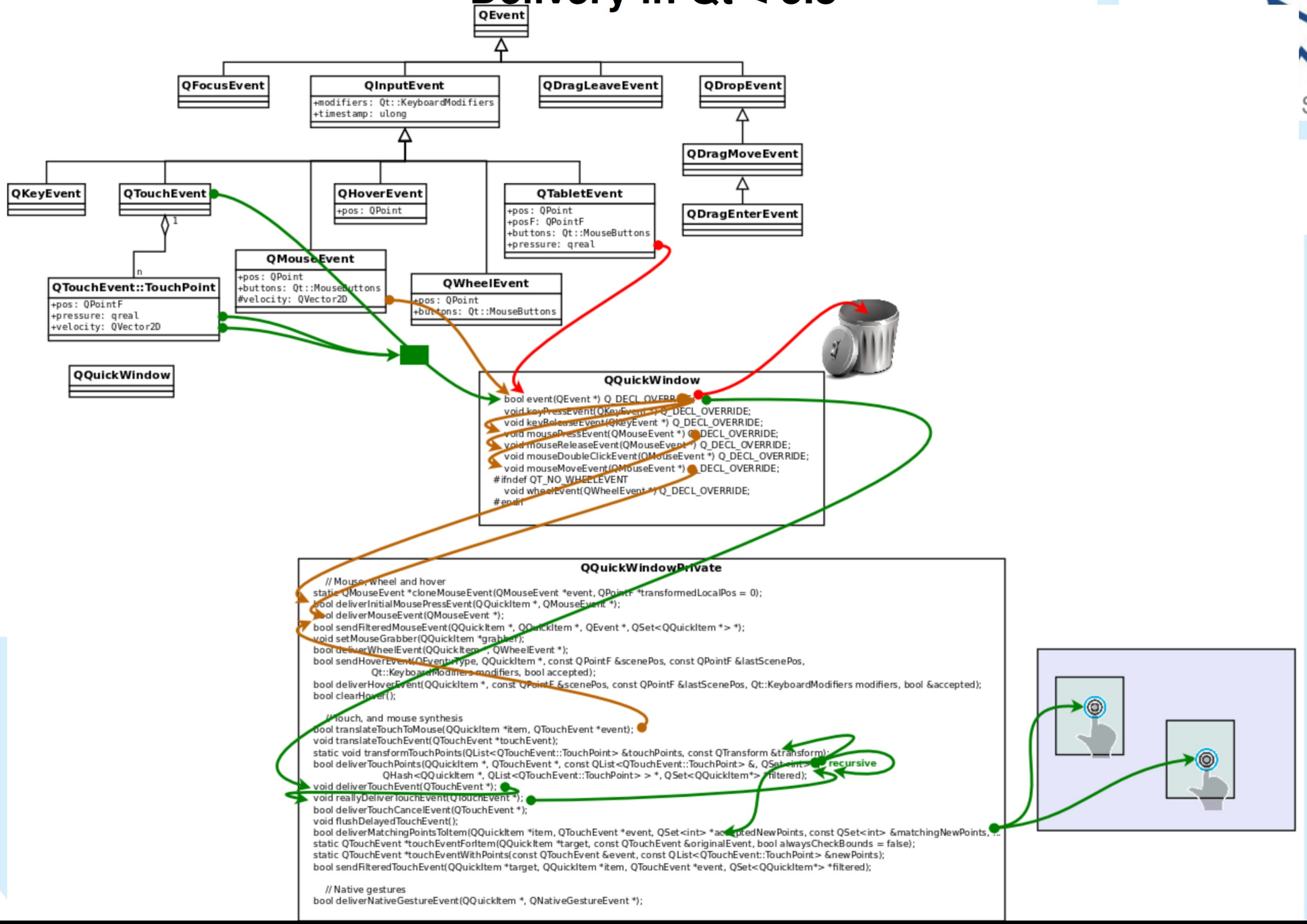
Goals

- Every QInputEvent carries a QInputDevice*
  - Qt::MouseEventSource was not enough
- Widgets, Qt Quick items and handlers keep working the same
- Common event delivery code for all QPointerEvents
- Qt Quick delivery simplified: no more wrappers
- Flickable handles touch (including replay: QTBUG-85607)
- Event objects as lightweight as possible
- Unblock fixing some old bugs
- Wacom tablets supported better
- Multi-seat

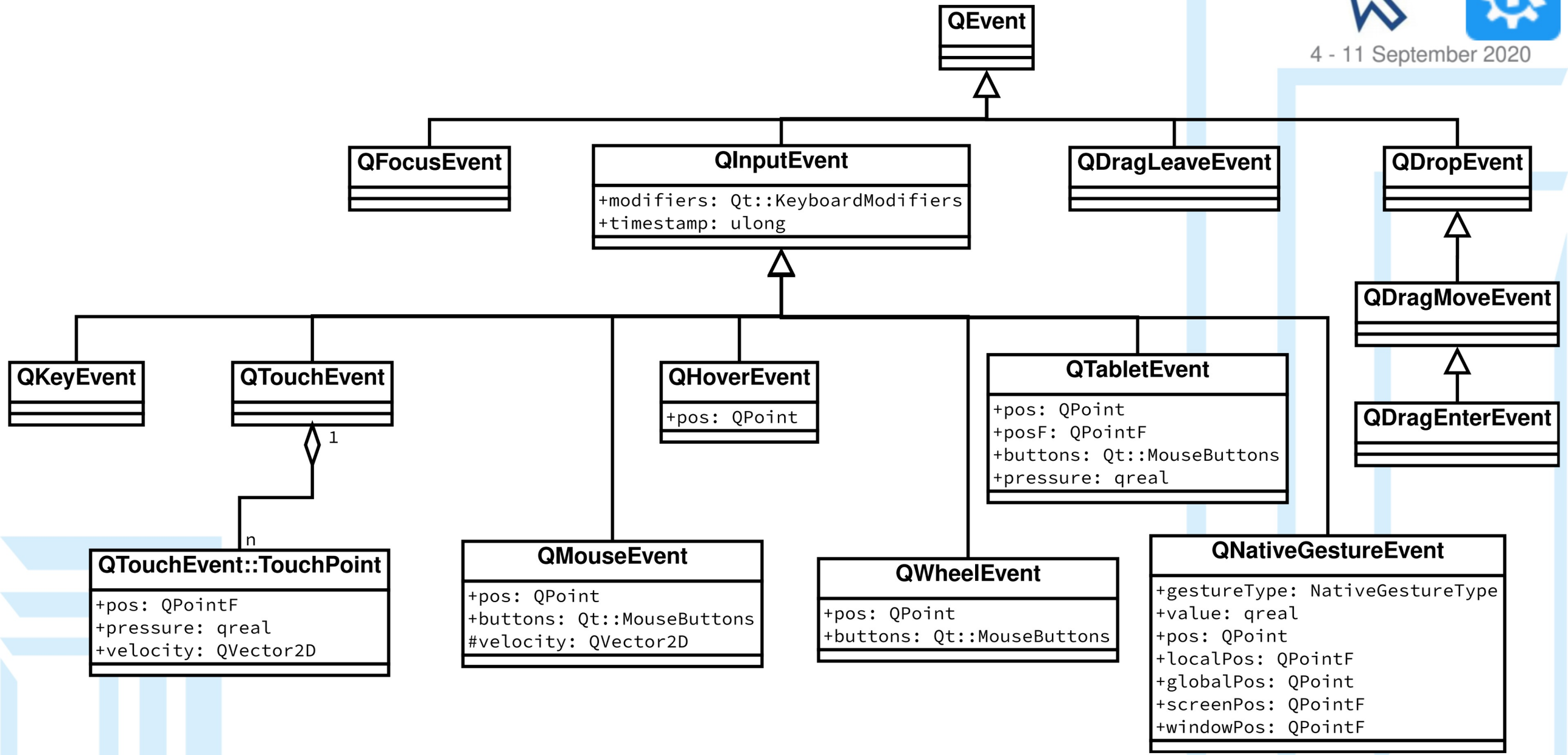
Initial conditions - Qt Quick

- QQuickPointerEvent is a QObject wrapper for QTouchEvent, QMouseEvent etc.
- QQuickEventPoint is a wrapper for QTouchEvent::TouchPoint
  - but every QQuickSinglePointEvent has one too
- QQuickEventPoint stores state between events: exclusive grabber, passive grabbers
- QQuickEventPoint has a parent pointer (QQuickPointerEvent *event) which is stable
  - So it can be passed alone to any function, C++ or QML, and knows its context
- Delivery code is simplified by these wrappers
- Wrappers were meant as a prototype for QInputEvent refactoring

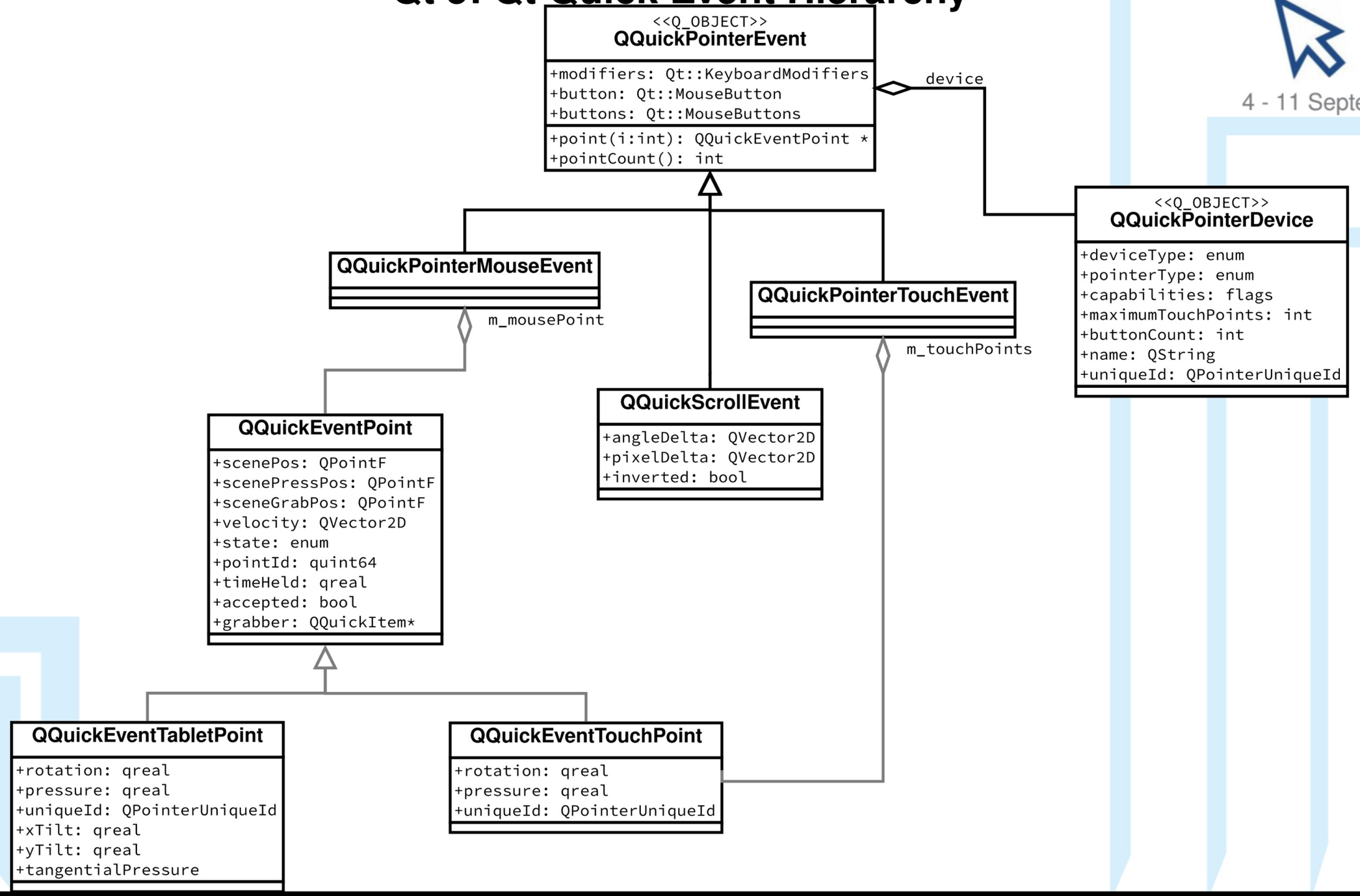
Delivery in Qt < 5.8



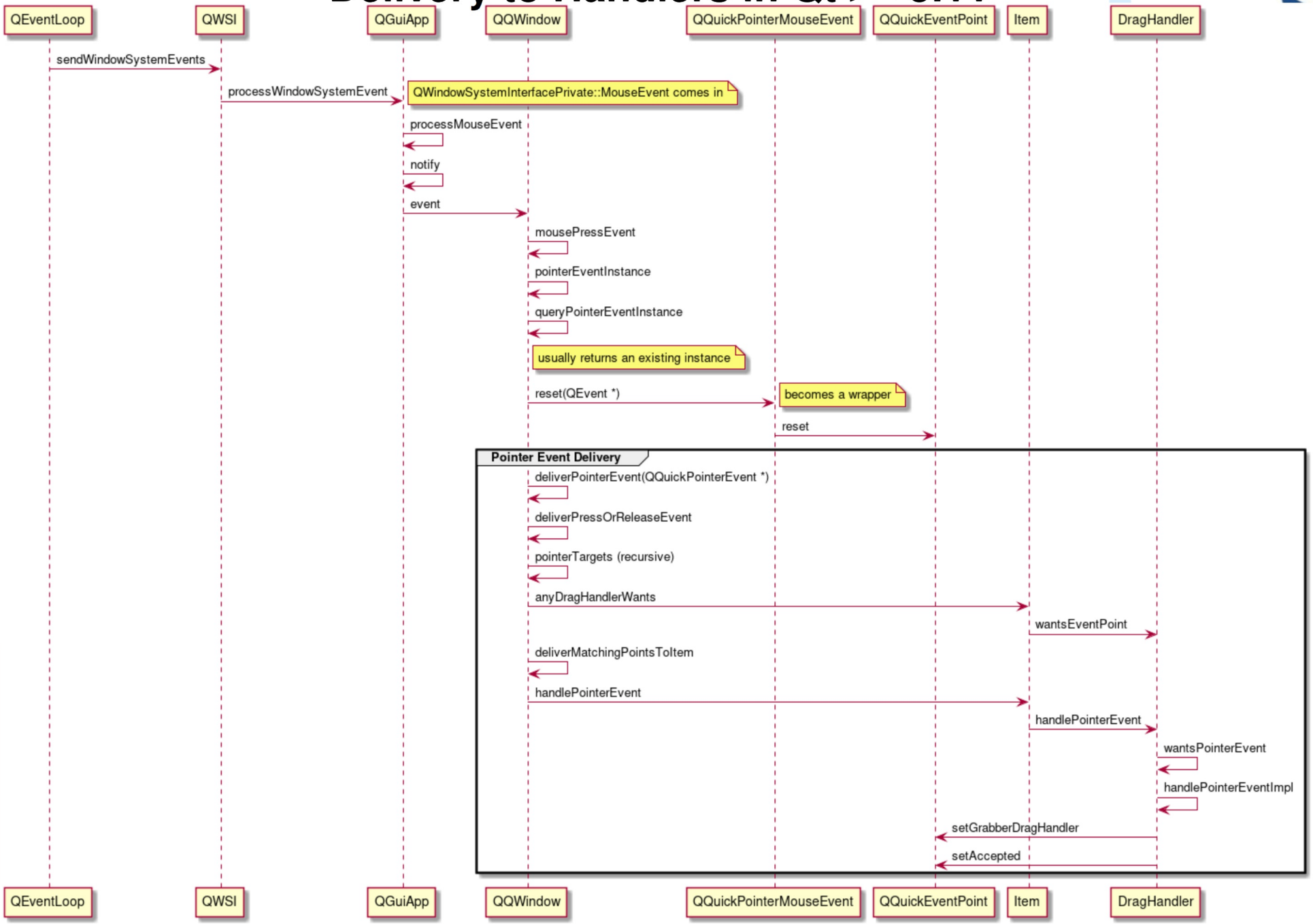
Qt 5: QEvent hierarchy



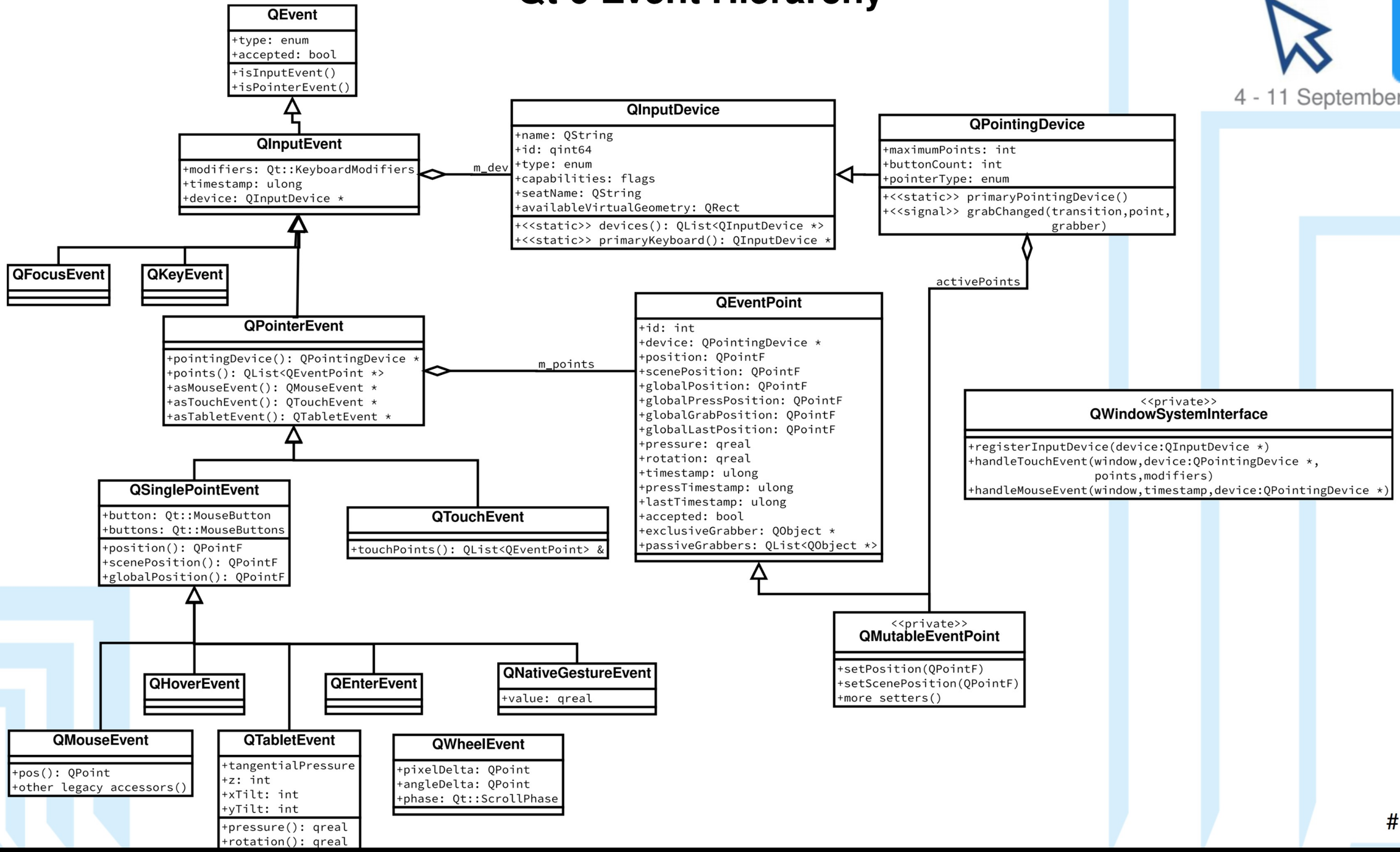
Qt 5: Qt Quick Event Hierarchy



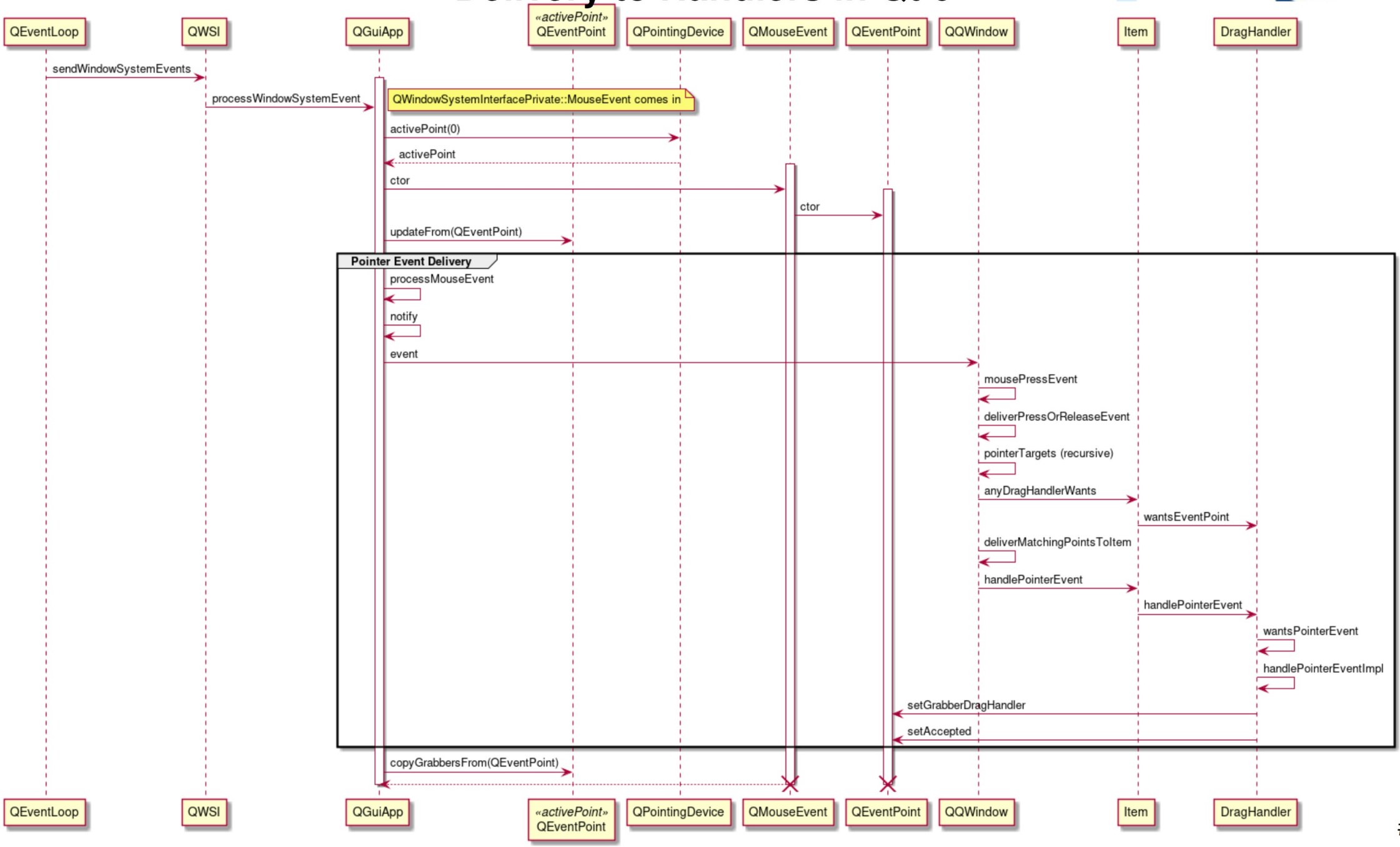
Delivery to Handlers in Qt >= 5.11



Qt 6 Event Hierarchy



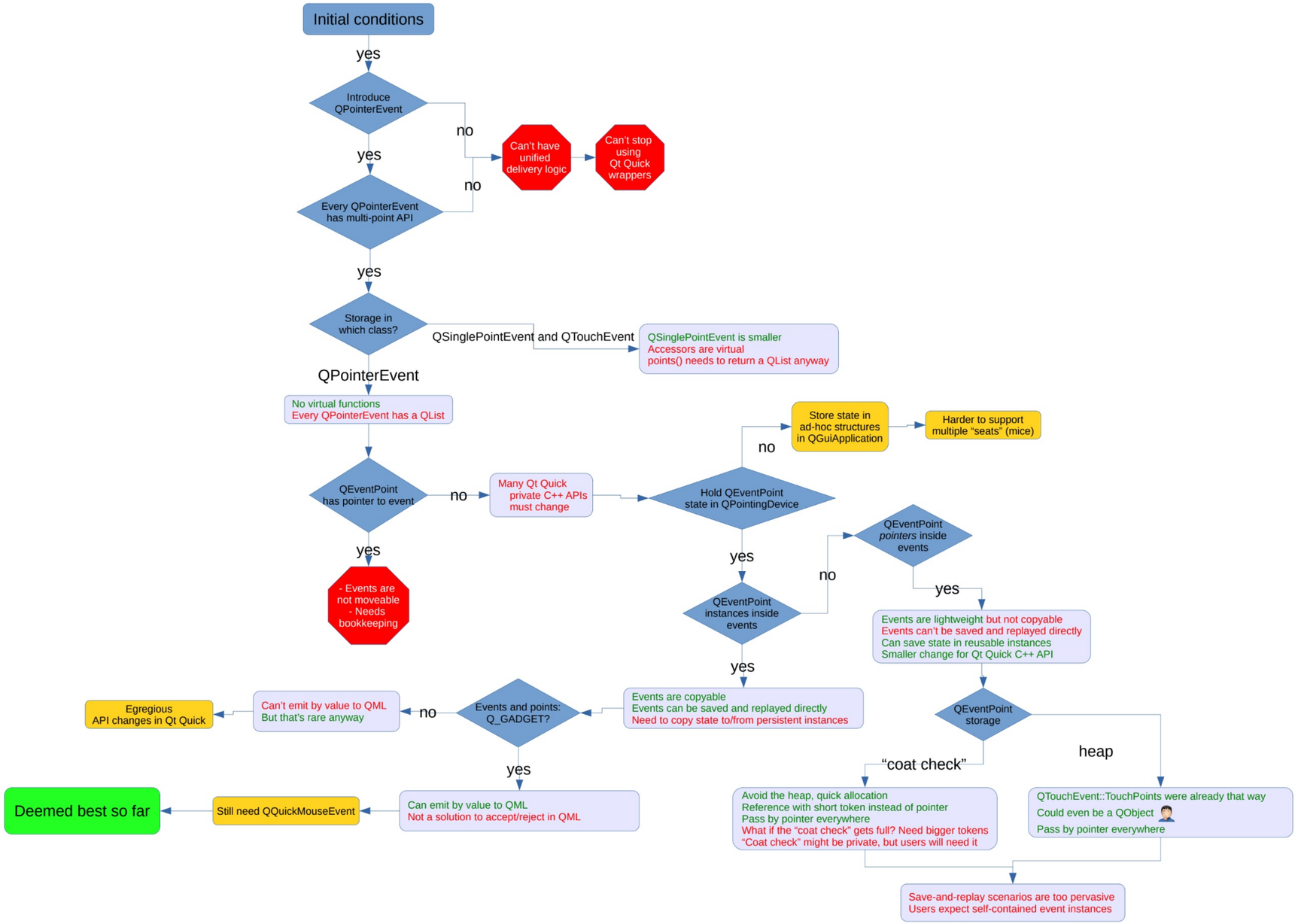
Delivery to Handlers in Qt 6



Initial conditions - QtGUI

- QTouchEvent::TouchPoint is heap-allocated and has a PIMPL in spite of being temporary
- QPA events (and touchpoints) are special unrelated mostly-duplicate classes
- QPA events are heap-allocated in spite of being temporary
- All QInputEvents are stack-allocated in QGuiApplication, and go out of scope after delivery
- QInputEvent subclasses have duplicated but incompatible API
- QTouchEvent can have multiple points

Design decisions



Agnosticism

```
 1:
 2: bool event(QEvent *ev) override
 3: {
 4:     if (ev->isPointerEvent() && static_cast<QPointerEvent *>(event)->isPressEvent()) {
 5:         for (QEventPoint &point : event->points()) {
 6:             if (reactToPress(point.position()))
 7:                 point.setExclusiveGrabber(this);
 8:         }
 9:         retun true;
10:     }
11:     return false;
12: }
13:
```

Is it a synthesized mouse event?

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```
 1:
 2: void mousePressEvent(QMouseEvent *event) override
 3: {
 4:     qDebug()
 5:         // The oldest API - unusable
 6:         << "spontaneous" << event->spontaneous()
 7:
 8:         // Qt::MouseEventSource : since Qt 5.4
 9:         << "source" << event->source()
10:         << "actual mouse?" << (event->source() == Qt::MouseEventNotSynthesized)
11:         << "perhaps from touch or tablet?" << (event->source() == Qt::MouseEventSynthesizedByQt)
12:
13:         // Similar to the QML Pointer Handlers acceptedDevices API (since 5.10)
14:         << "device type" << event->pointingDevice()->type()
15:         << "from touchscreen?" << (event->pointingDevice()->type() == QInputDevice::DeviceType::TouchScreen)
16:         << "from touchpad?" << (event->pointingDevice()->type() == QInputDevice::DeviceType::TouchPad)
17:
18:         // Similar to the QML Pointer Handlers acceptedPointerTypes API (since 5.10)
19:         << "pointer type" << event->pointingDevice()->pointerType()
20:         << "from finger?" << (event->pointingDevice()->pointerType() == QPointingDevice::PointerType::Finger)
21:         << "from eraser?" << (event->pointingDevice()->pointerType() == QPointingDevice::PointerType::Eraser);
22: }
23:
```

PointHandler

```
import QtQuick 2.14
import QtQuick.Shapes 1.0


Item {
    id: root
    width: 480
    height: 480

    Shape {
        id: crosshairs
        x: handler.point.position.x - width / 2
        y: handler.point.position.y - height / 2
        width: 300; height: 300
        // visible: handler.pressed
        rotation: handler.point.rotation
        ShapePath {
            strokeColor: "red"
            fillColor: "transparent"
            strokeWidth: 3
            startX: crosshairs.width / 2; startY: 0
            PathLine { x: crosshairs.width / 2; y: crosshairs.height }
            PathMove { x: 0; y: crosshairs.height / 2 }
            PathLine { x: crosshairs.width; y: crosshairs.height / 2 }
        }
        ShapePath {
            strokeColor: "lightgray"
            strokeWidth: 5
            startX: crosshairs.width / 2; startY: crosshairs.height / 2
            PathLine {
                relativeX: handler.point.velocity.x * 50
                relativeY: handler.point.velocity.y * 50
            }
```

Stuff left to work on

- Flickable: make it flick nicer
- Flickable: event replay
- rename QPointingDevice to QPointerDevice?
- get rid of QPointingDevice::pointerType?


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