Christoph Sterz

Qt on the Second Screen
A Talk about Remoting Your Application

KDAB

1. The Case for a Second Screen

2. What are the Options
Show some Demos!

3. The current State
and Future Wishes

The Qt, OpenGL and C++ experts

Factory-Floor Situation – SCADA

Multi-Milion Dollar Machines

—You always want to at least see their status

Surgery Situation

The device is inaccessible *for specific reasons*

Real World Example: pre-surgery briefing

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Distinction

You produce *"basically the same"* devices
as your competitors do

but yours can be controlled with a smartphone
(you win!)

No Screen

Premium variant A and mid- B have a screen

there is a market for a C—it just has no screen

Remote Servicing

Assist and maintain devices for your customers remotely

Remote Deployment

If your second screen can be a web-page,
you multiply your opportunities to run it.

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Users can choose where to view your second screen
BYOD

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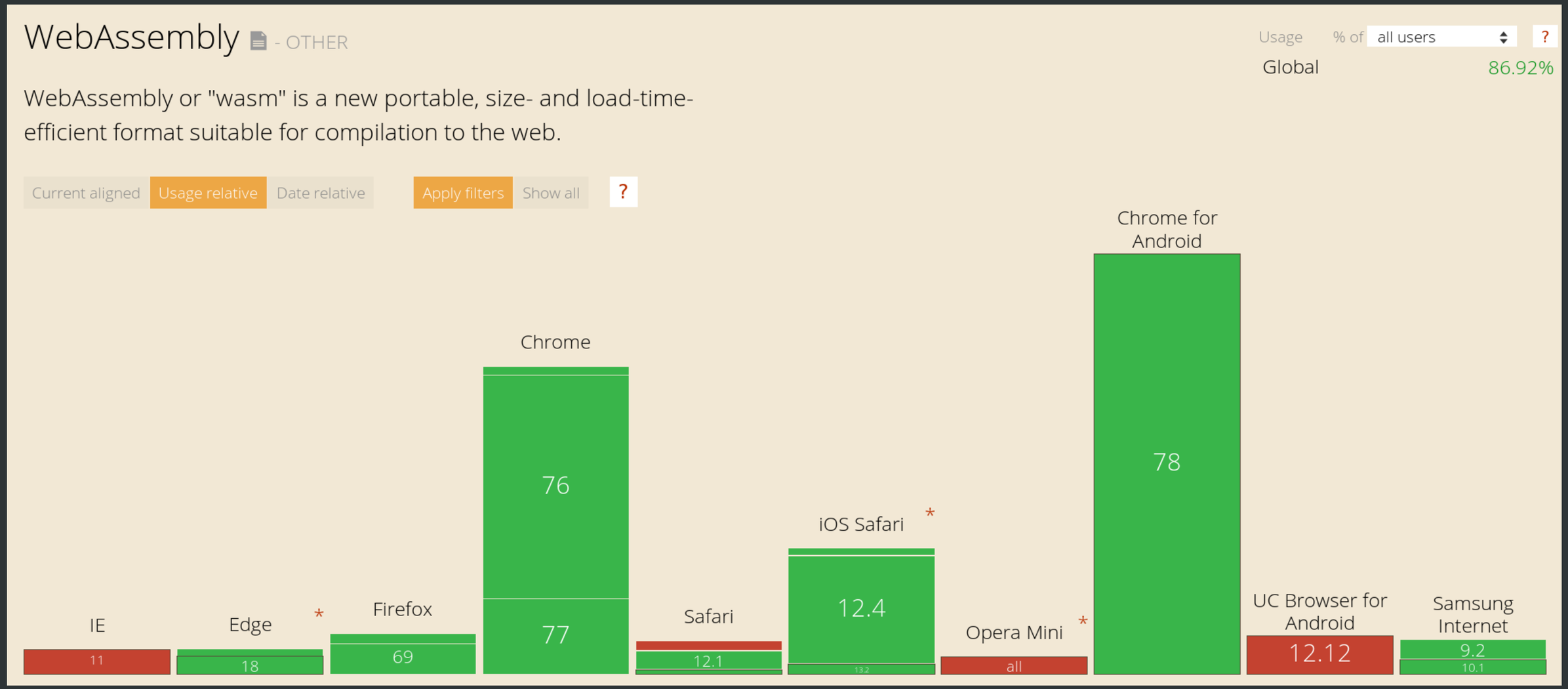
you multiply your opportunities to run it.

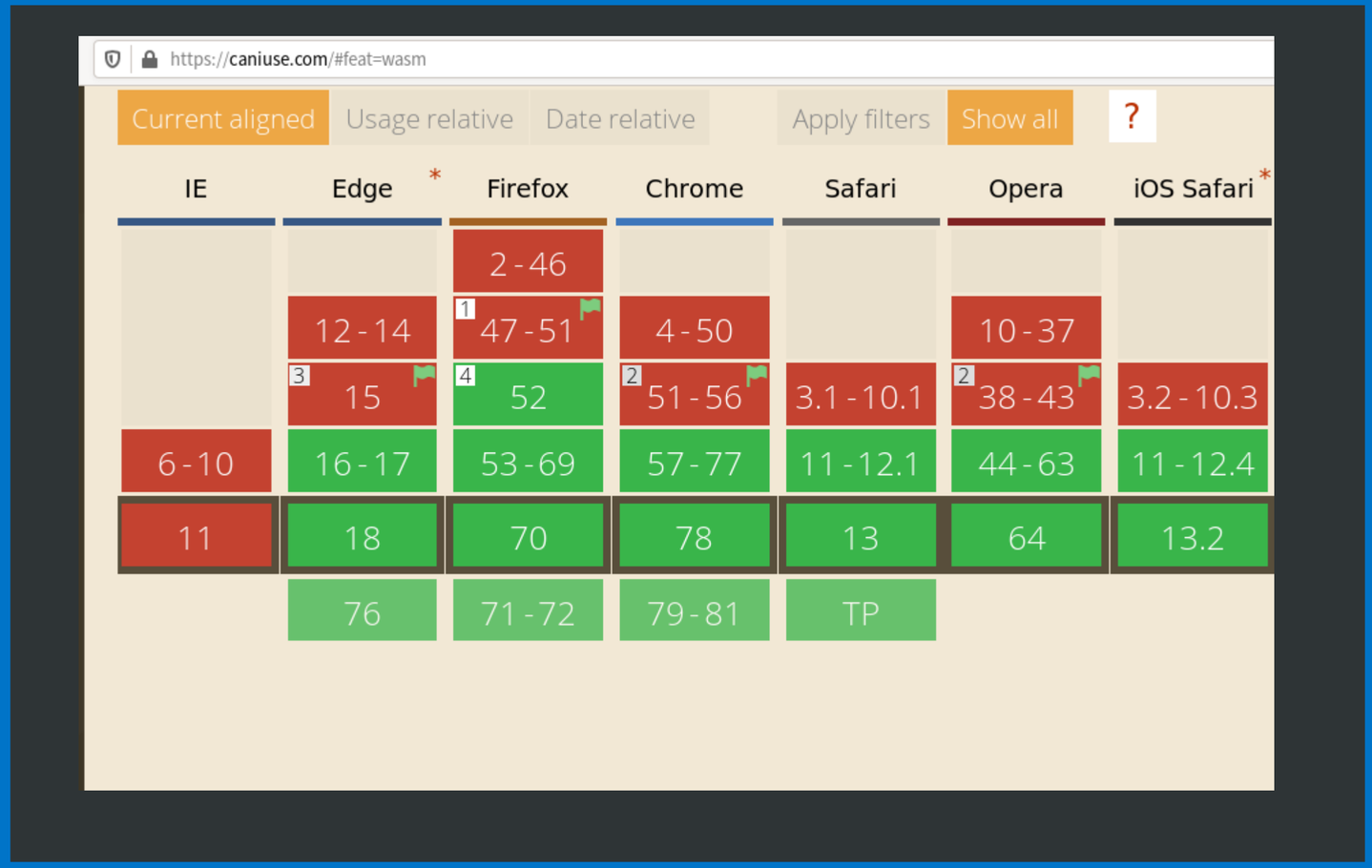
Users can choose where to view your second screen
BYOD

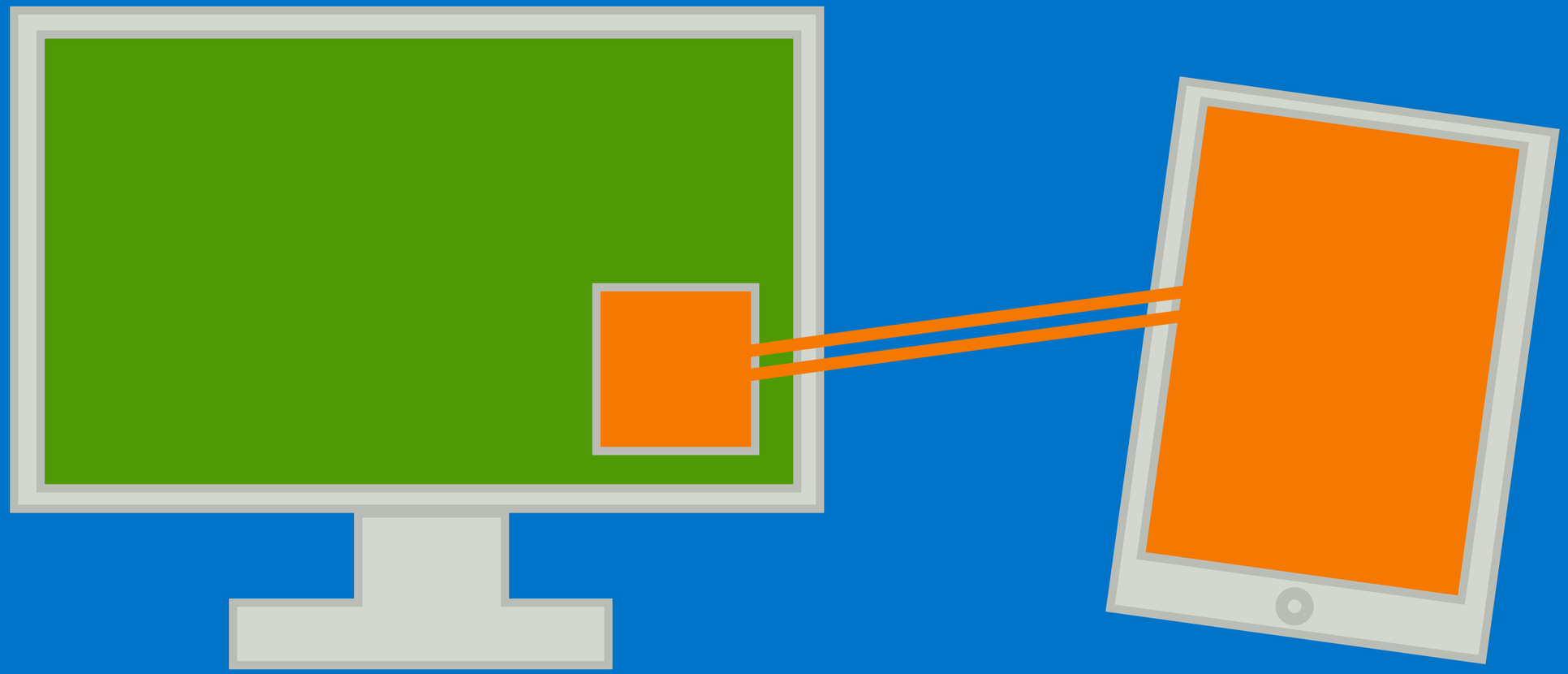
For WebASM: Deployment can become possible on formerly restricted platforms

(WebASM Case)


WebAssembly - OTHER
Usage
% of all users
?
Global
86.92%
WebAssembly or "wasm" is a new portable, size- and load-time-efficient format suitable for compilation to the web.
Current aligned
Usage relative
Date relative
Apply filters
Show all
?
IE
11
Edge
*
18
Firefox
69
Chrome
76
77
Safari
12.1
iOS Safari
*
12.4
13.2
Opera Mini
*
all
Chrome for Android
78
UC Browser for Android
12.12
Samsung Internet
9.2
10.1

(WebASM Case)


https://caniuse.com/#feat=wasm
Current aligned
Usage relative
Date relative
Apply filters
Show all
?
IE
Edge *
Firefox
Chrome
Safari
Opera
iOS Safari *
2 - 46
12 - 14
1 47 - 51
4 - 50
10 - 37
3 15
4 52
2 51 - 56
3.1 - 10.1
2 38 - 43
3.2 - 10.3
6 - 10
16 - 17
53 - 69
57 - 77
11 - 12.1
44 - 63
11 - 12.4
11
18
70
78
13
64
13.2
76
71 - 72
79 - 81
TP



Have a second Screen, because it fits your application.

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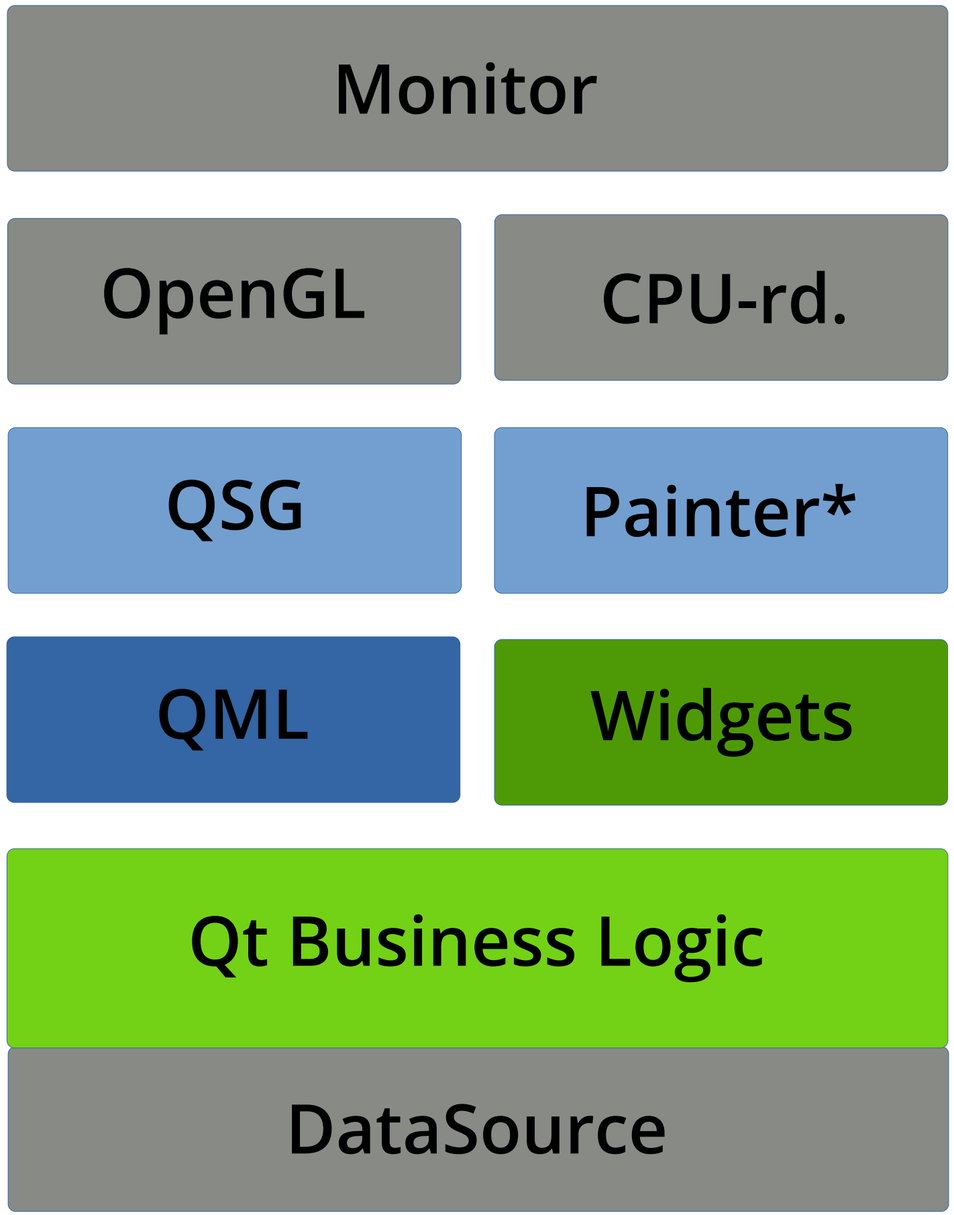
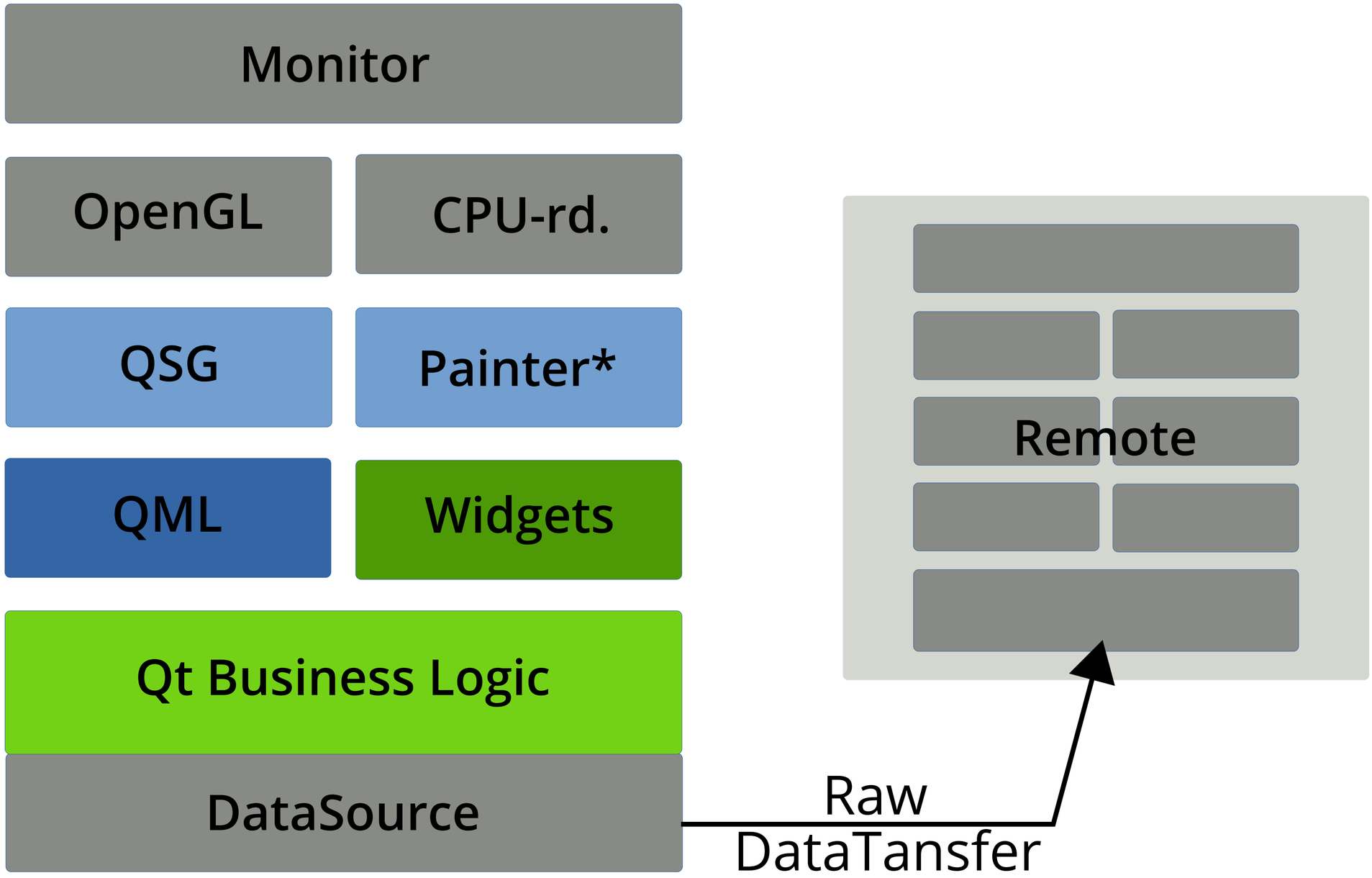
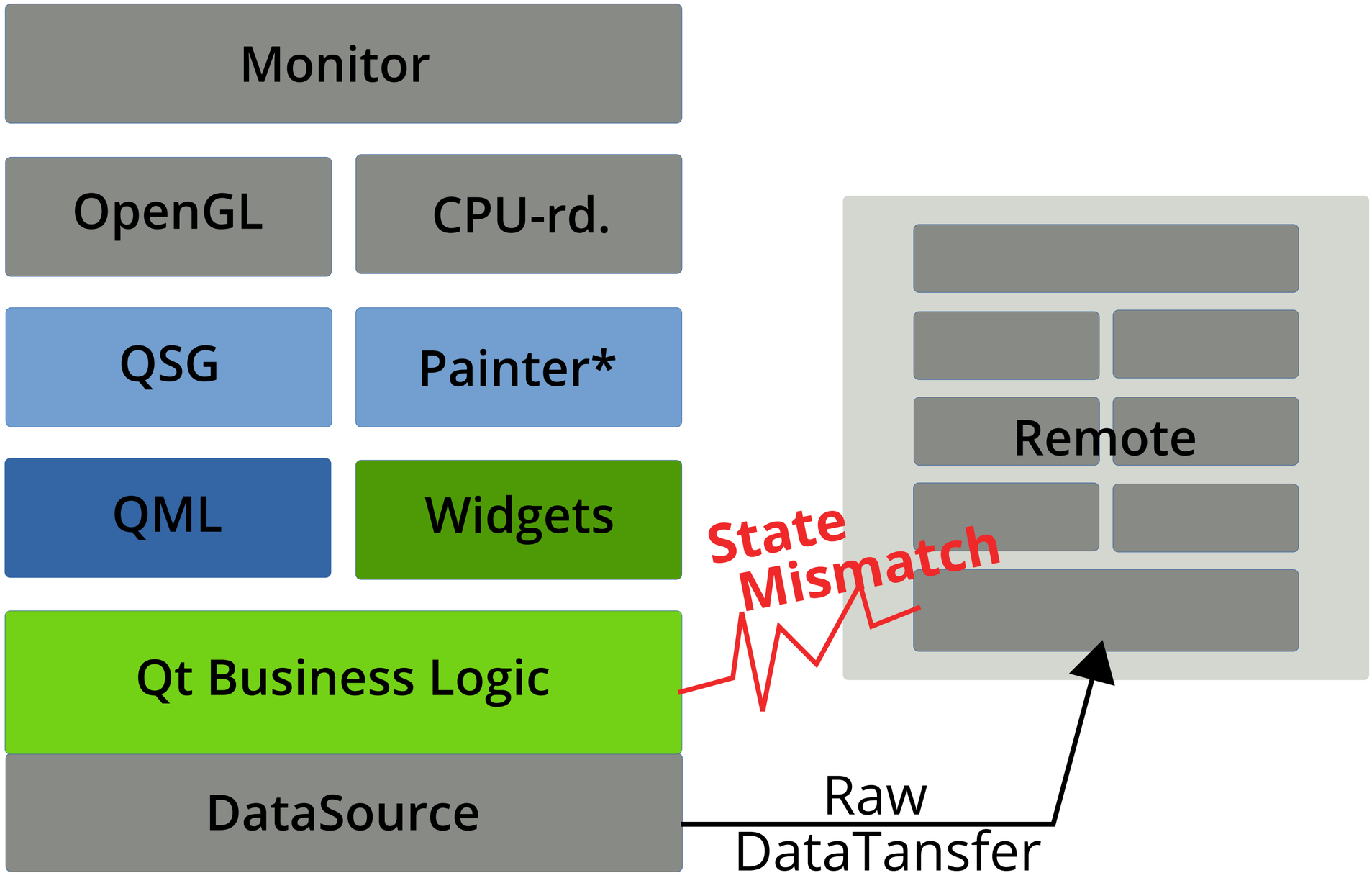
Which Technologies exist?
How can we remote apps using Qt?

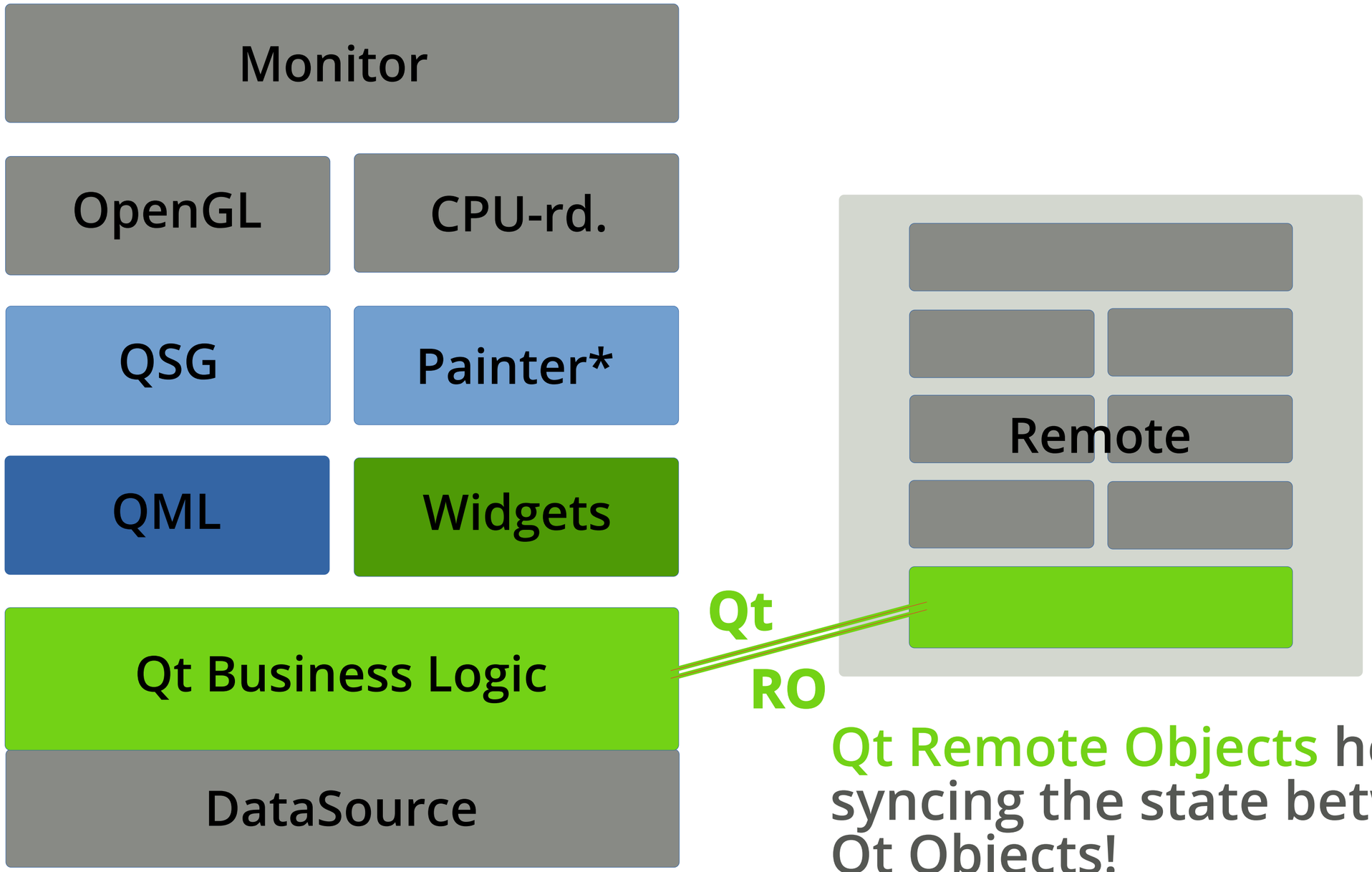


Remote

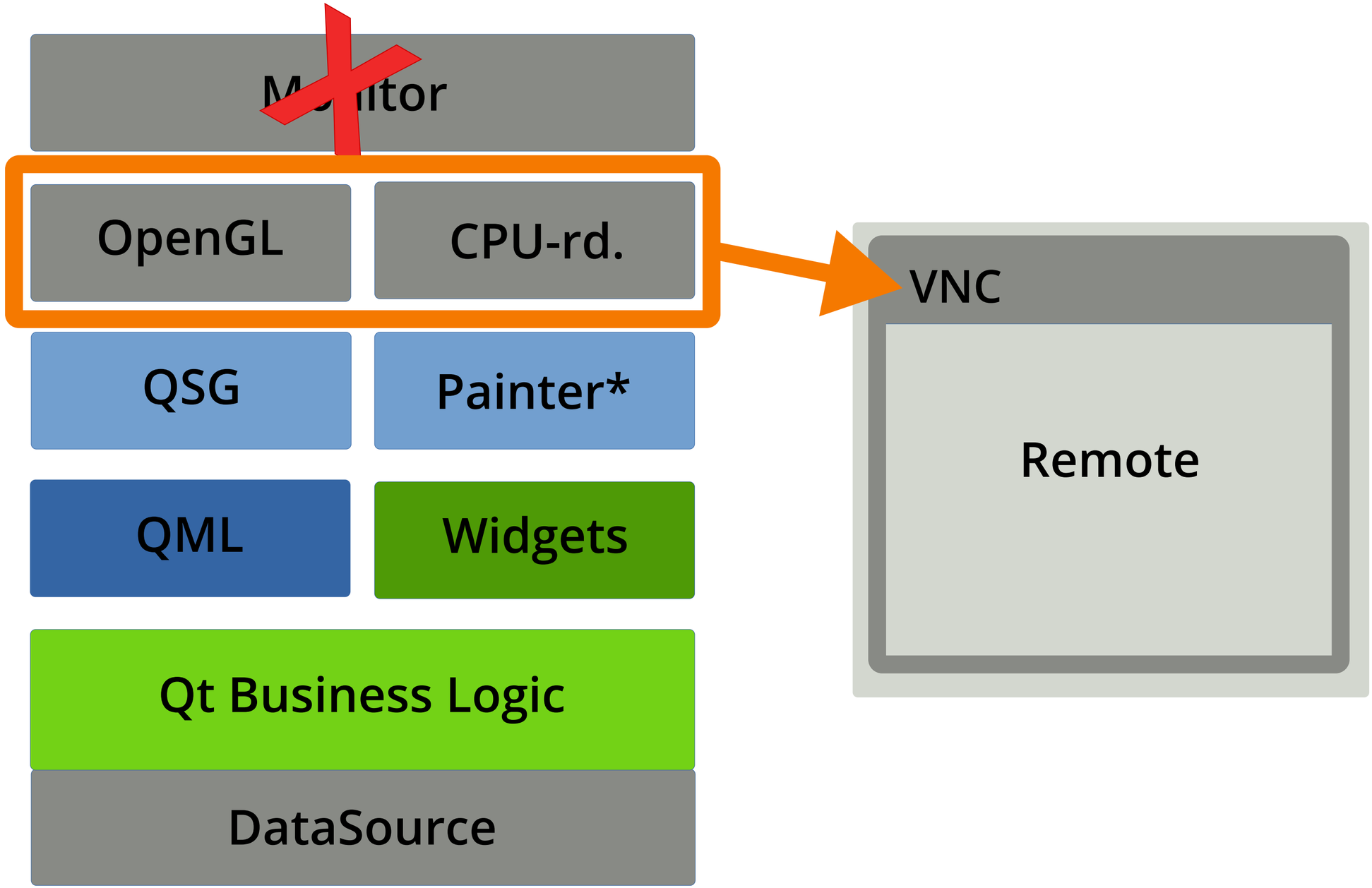
* Paint Engines vary

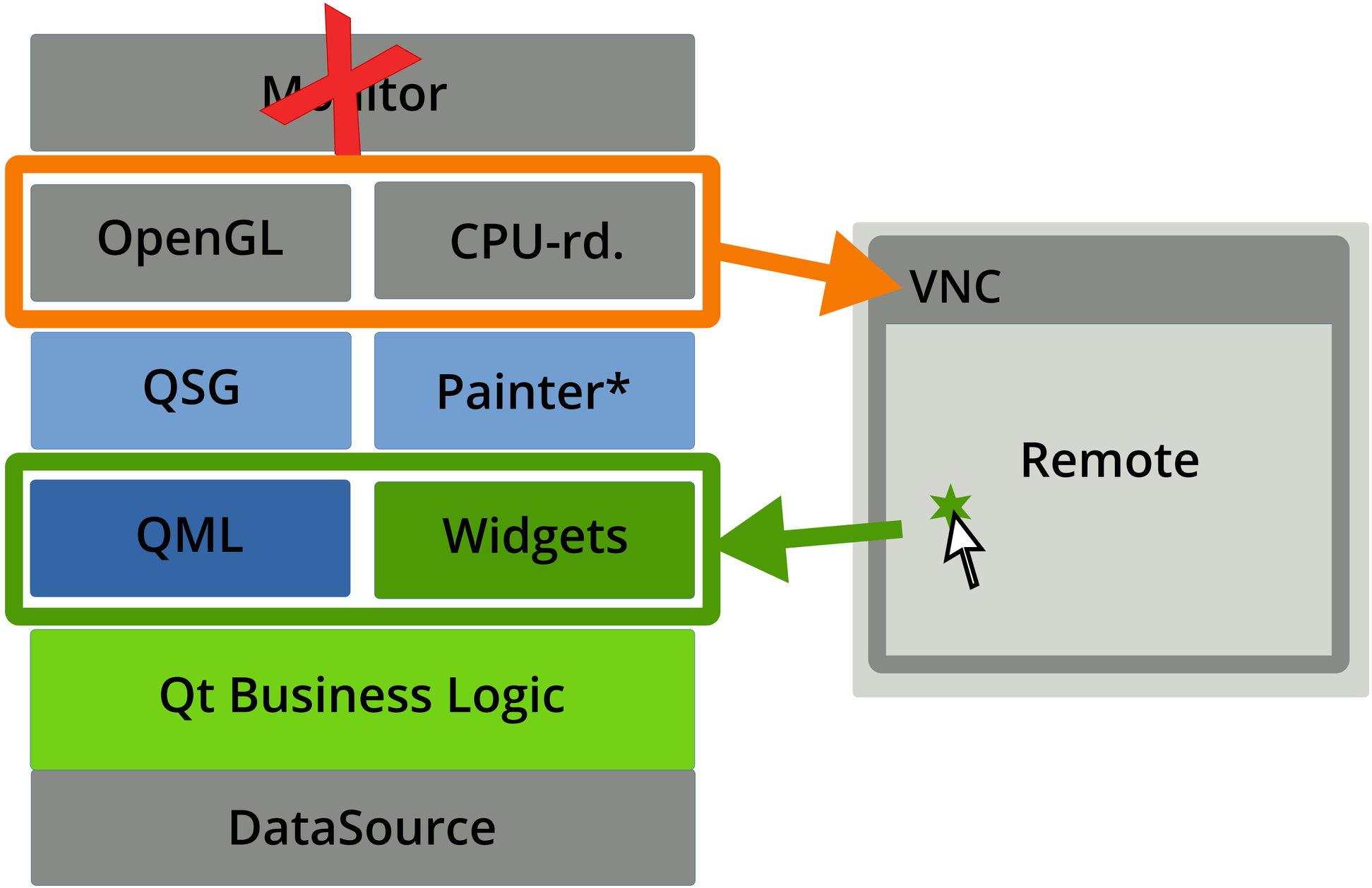

Monitor
OpenGL
CPU-rd.
QSG
Painter*
QML
Widgets
Qt Business Logic
DataSource
Remote
Raw
DataTansfer

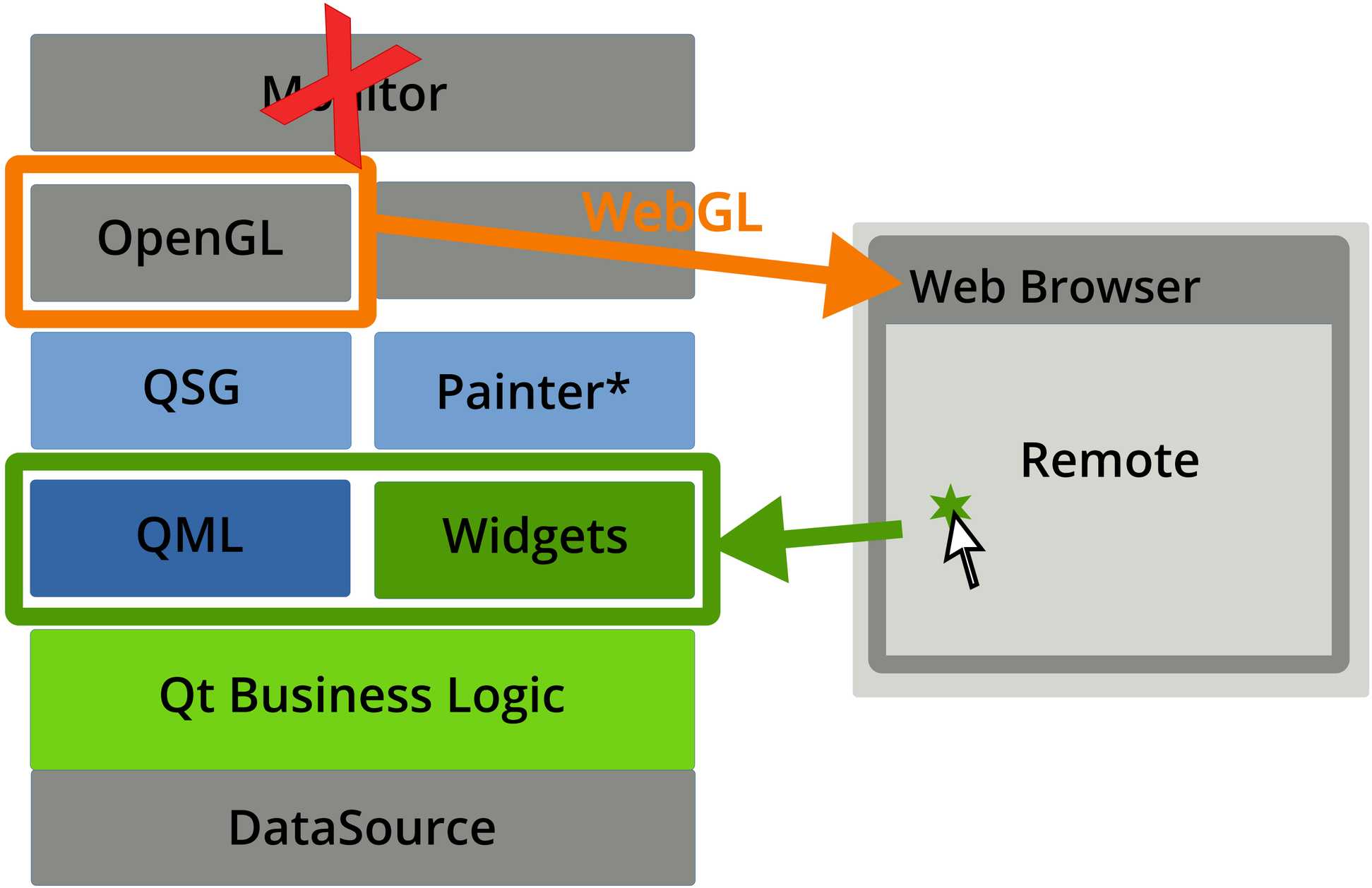

Monitor
OpenGL
CPU-rd.
QSG
Painter*
QML
Widgets
Qt Business Logic
DataSource
Remote
State
Mismatch
Raw
DataTansfer

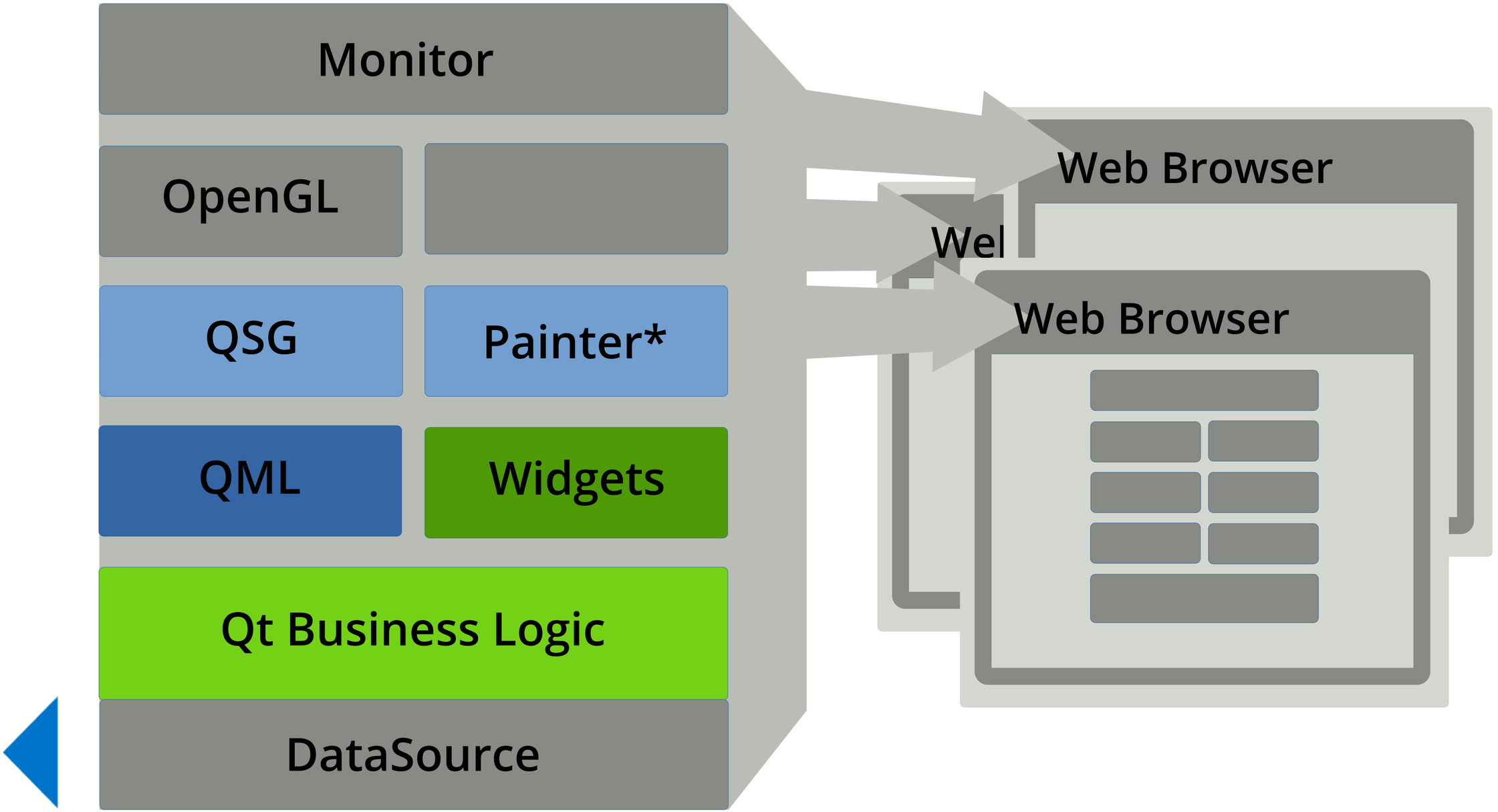


Qt Remote Objects help syncing the state between Qt Objects!


Monitor
OpenGL
CPU-rd.
QSG
Painter*
QML
Widgets
Qt Business Logic
DataSource
VNC
Remote


Monitor
OpenGL
CPU-rd.
QSG
Painter*
QML
Widgets
Qt Business Logic
DataSource
VNC
Remote


Monitor
OpenGL
WebGL
Web Browser
Remote
QSG
Painter*
QML
Widgets
Qt Business Logic
DataSource



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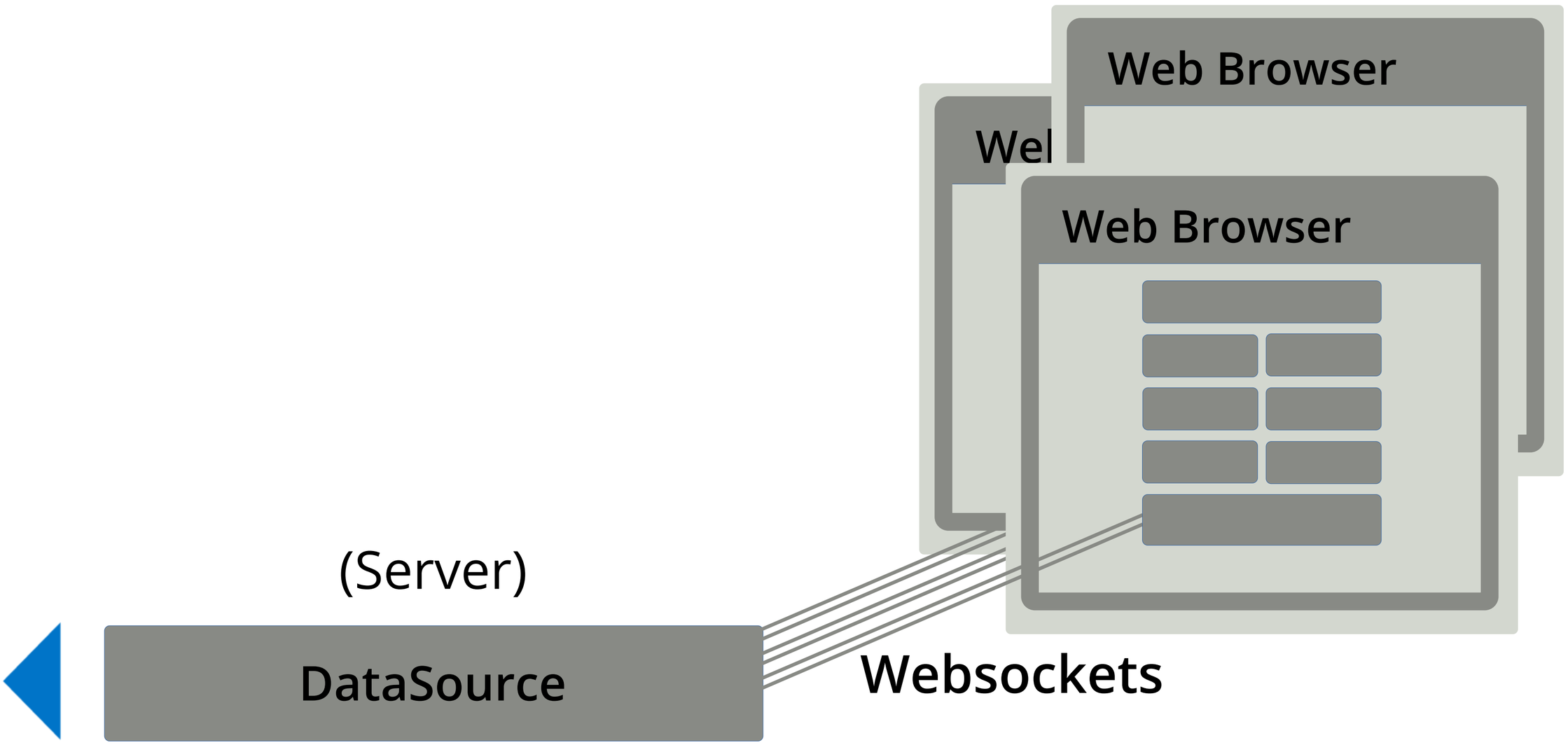
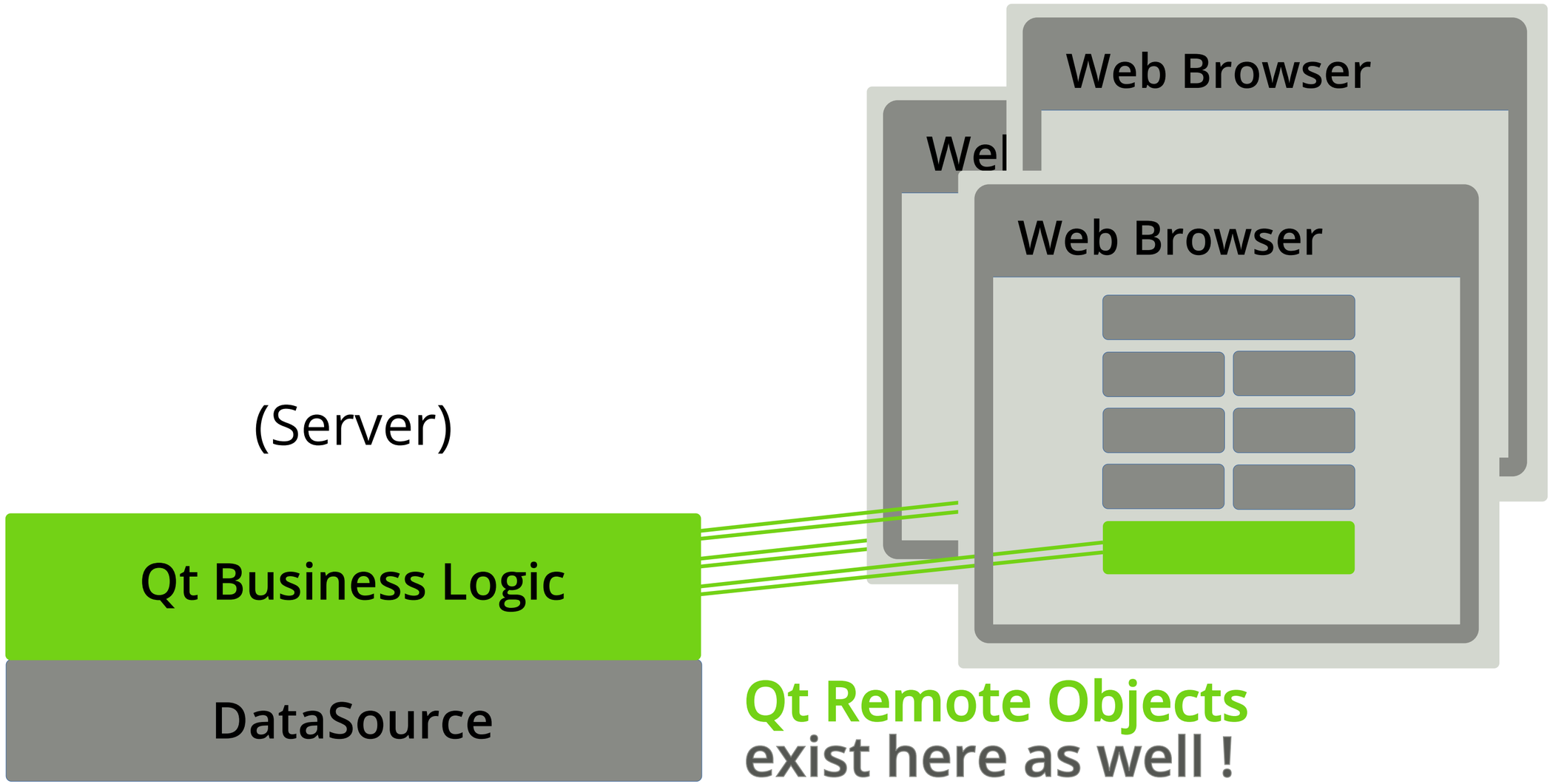
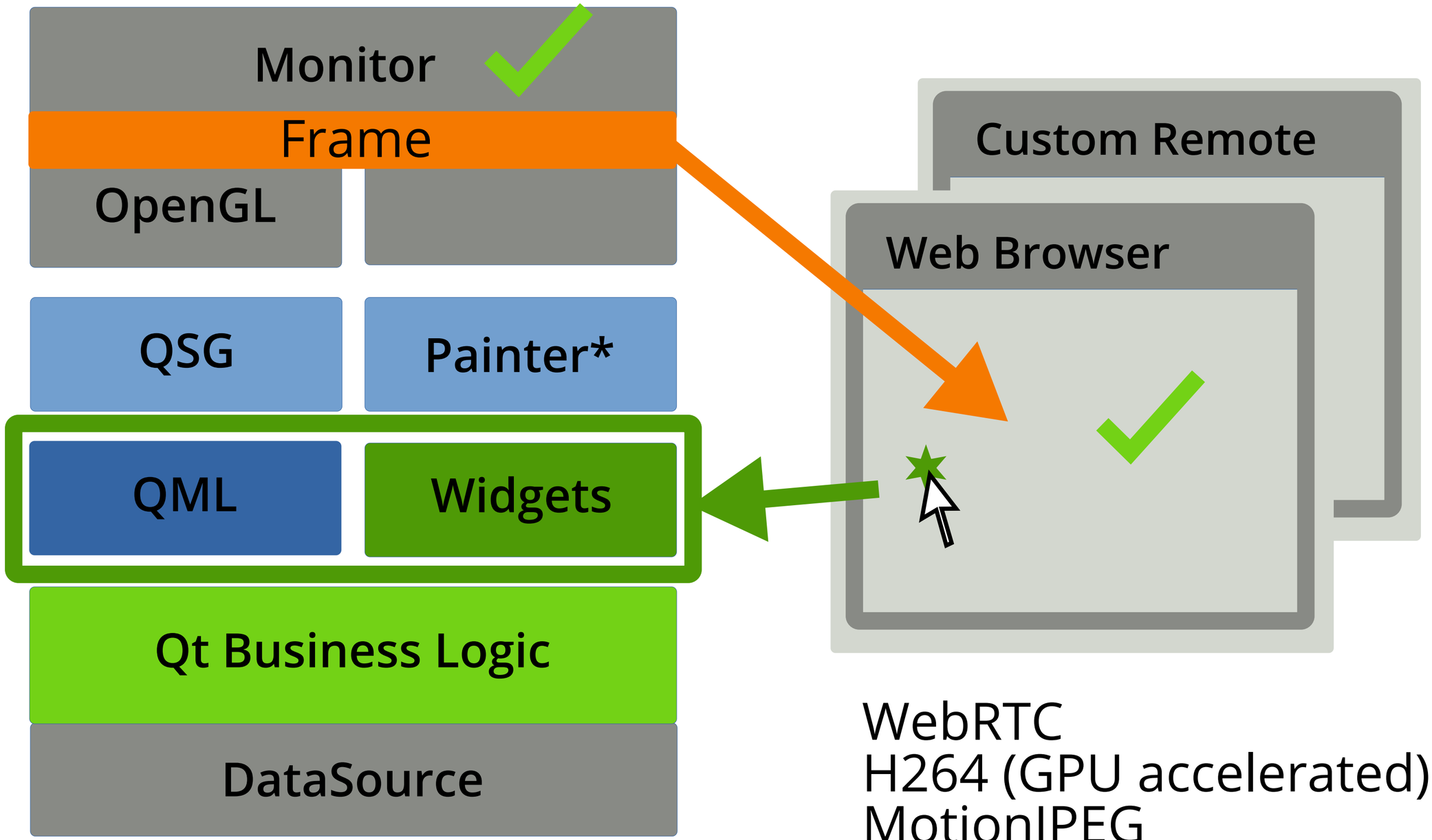
The Qt, OpenGL and C++ experts


Web Browser
Wel
Web Browser
(Server)
DataSource
Websockets



Qt Remote Objects
exist here as well !



WebRTC
H264 (GPU accelerated)
MotionJPEG

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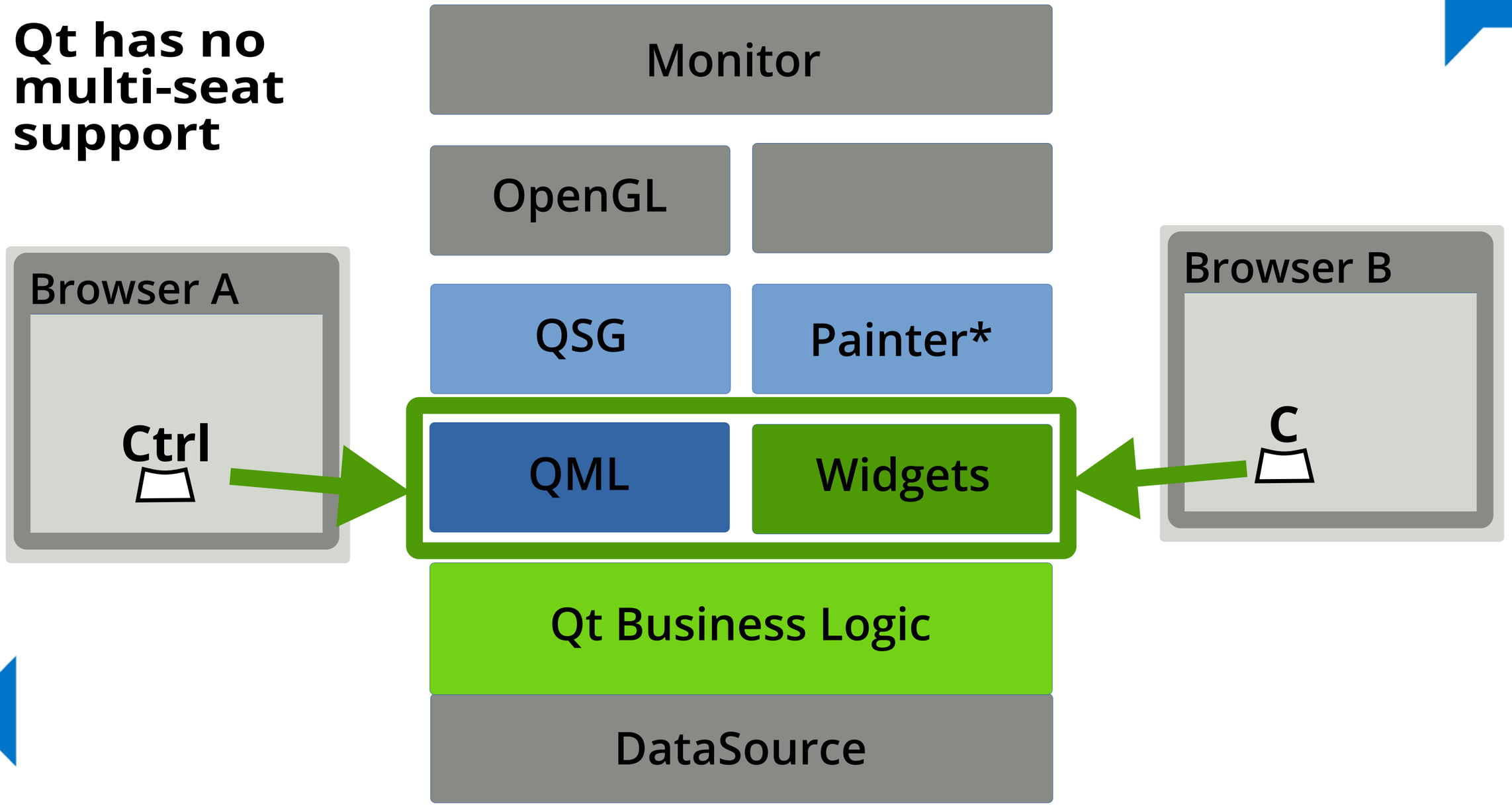
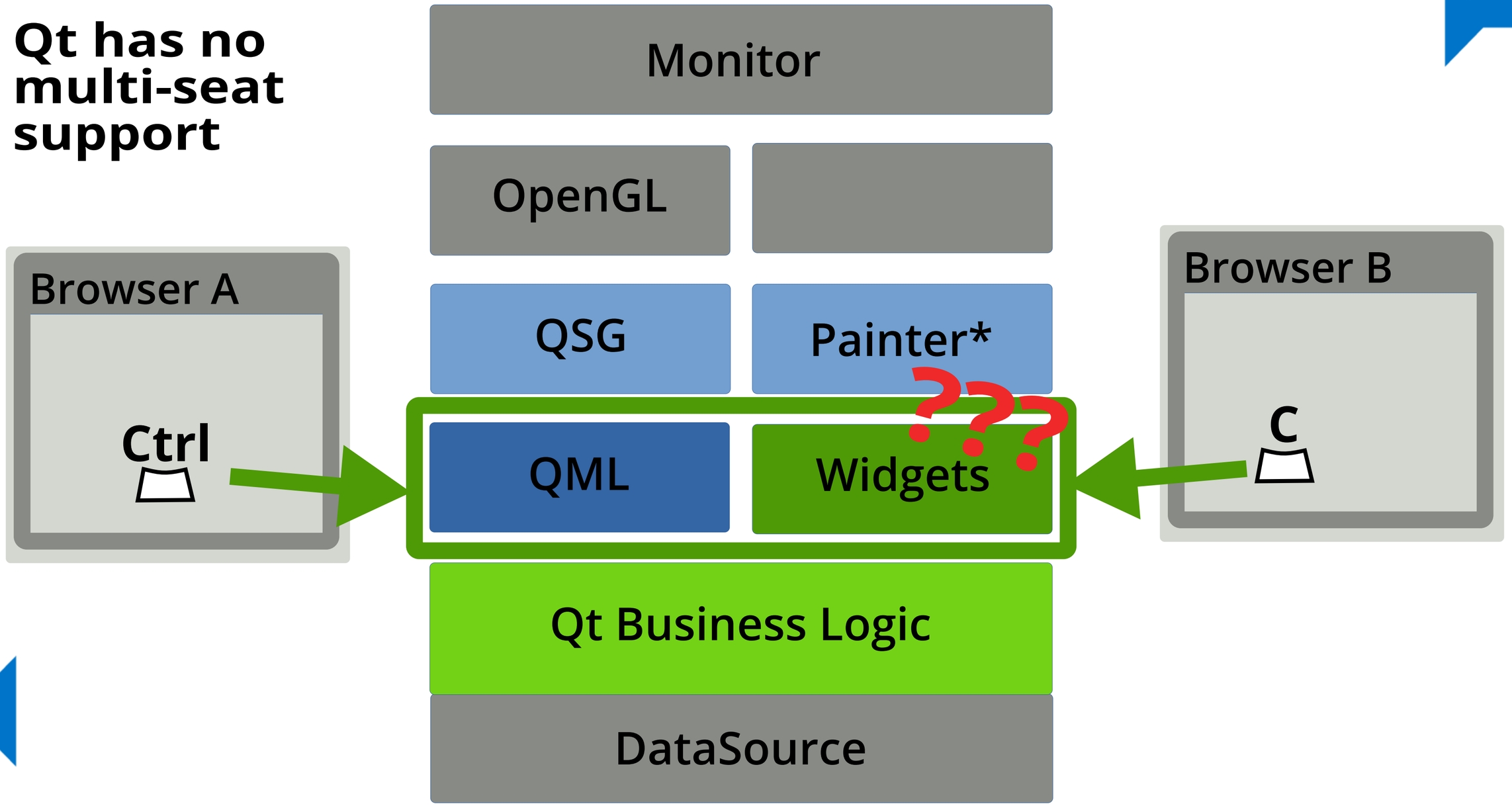
...

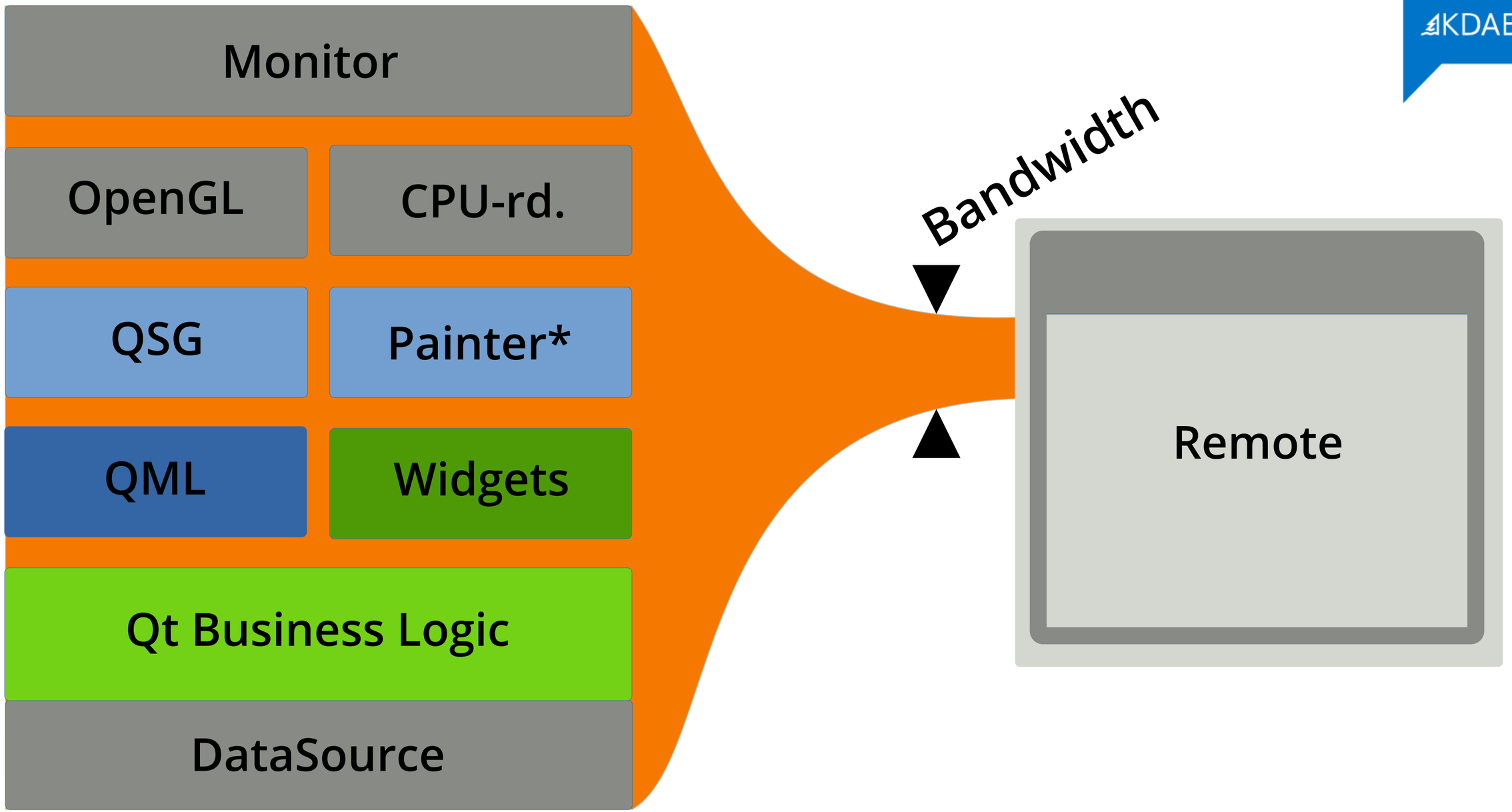
Yet there are still some problems on our way

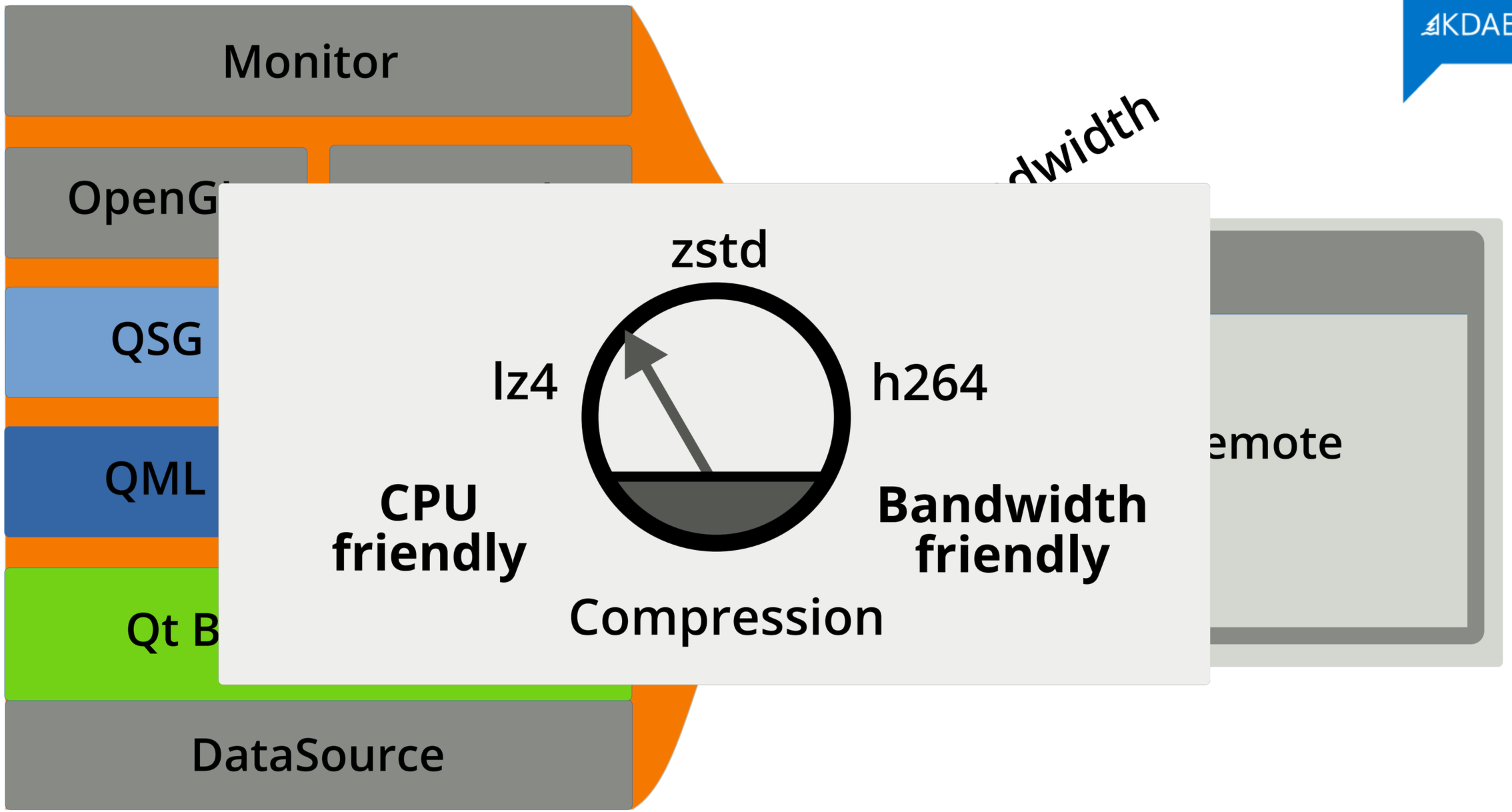
Qt has no multi-seat support

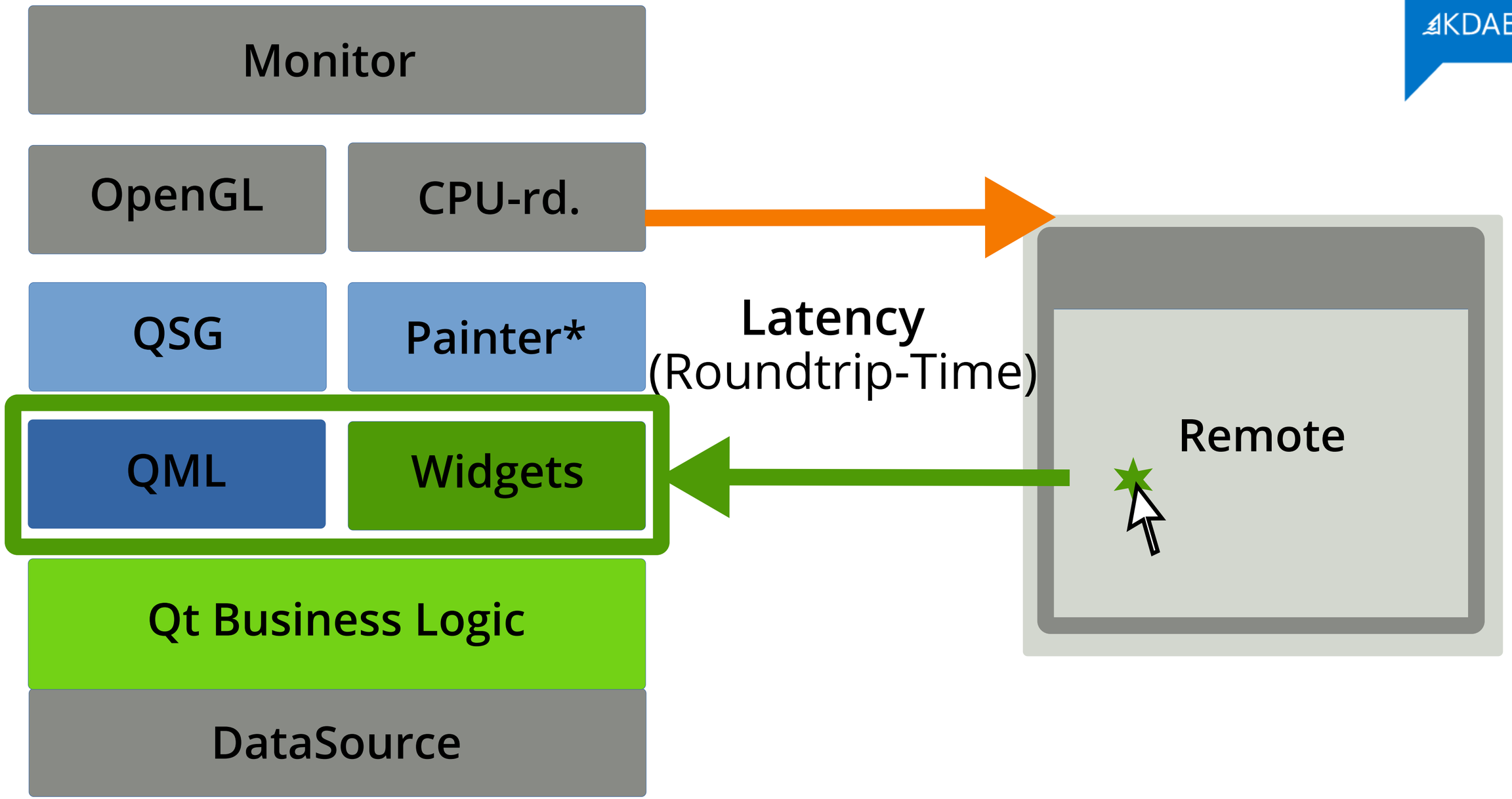


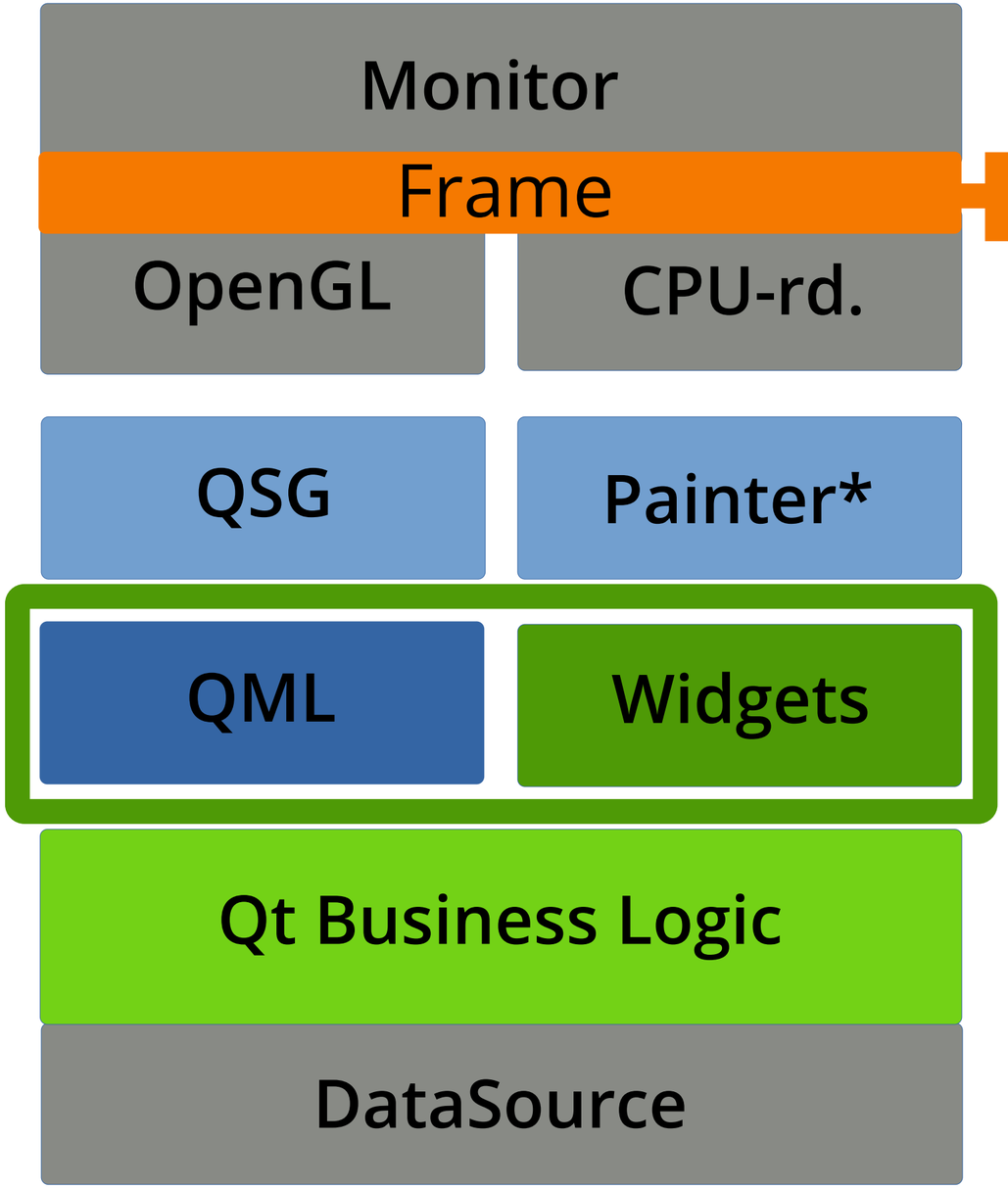
Qt has no multi-seat support




Monitor
OpenGL
CPU-rd.
QSG
Painter*
QML
Widgets
Qt Business Logic
DataSource
Bandwidth
Remote


Monitor
QSG
QML
DataSource
zstd
lz4
h264
CPU friendly
Bandwidth friendly
Compression


Monitor
OpenGL
CPU-rd.
QSG
Painter*
QML
Widgets
Qt Business Logic
DataSource
Latency
(Roundtrip-Time)
Remote



RawFrame ABI

Based on the PlatformPlugin

Technology	Effort	FPS	Resources	Maturity	Displ.	Mirror	Deploy
BackendData	↓↓	↑↑↑	↑↑↑	↓	✓	✗	✗
QtRemoteObj.	↓	↑↑↑	↑↑↑	↑	✓	✓	✗
VNC	↑↑↑	↓	↓↓	↑↑↑	✓✗	✓✗	✗
WebGL	↑↑↑	↑↓	↑↑↑	↓↓	✗	✗	✗
WebAssembly	↓	↑↑	↑↑↑	↓	✗	✗	✓
Streaming	↑	↓	↓↓↓	↓	✓	✓	✗

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Thank you!

christoph.sterz@kdab.com

The Qt, OpenGL and C++ experts

Technology	Effort	FPS	Resources	Maturity	Displ.	Mirror	Deploy
BackendData	↓↓	↑↑↑	↑↑↑	↓	✓	✗	✗
QtRemoteObj.	↓	↑↑↑	↑↑↑	↑	✓	✓	✗
VNC	↑↑↑	↓	↓↓	↑↑↑	✓✗	✓✗	✗
WebGL	↑↑↑	↑↓	↑↑↑	↓↓	✗	✗	✗
WebAssembly	↓	↑↑	↑↑↑	↓	✗	✗	✓
Streaming	↑	↓	↓↓↓	↓	✓	✓	✗