

Hands-On: Data Acquisition with LabVIEW NXG

Agenda

Introduction

(10 Minutes)

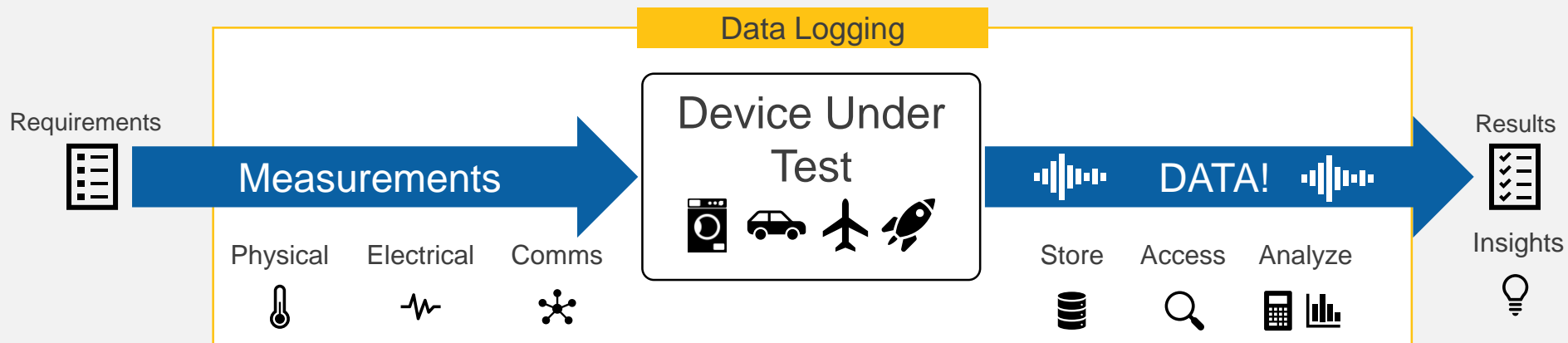
CompactDAQ and LabVIEW Hands-On Exercises

(1 Hours)

Wrap Up

(5 Minutes)

What Is Datalogging?



When to Use LabVIEW?

- More custom data acquisition system
- Multiple vendor hardware
- Inline data analysis
- Full control of data files produced
- Control of the data acquisition system

Components of a DAQ System

Sensor



Hardware



Signal
Conditioning

Analog-to-Digital
Converter

Software



Driver
Software

Application
Software



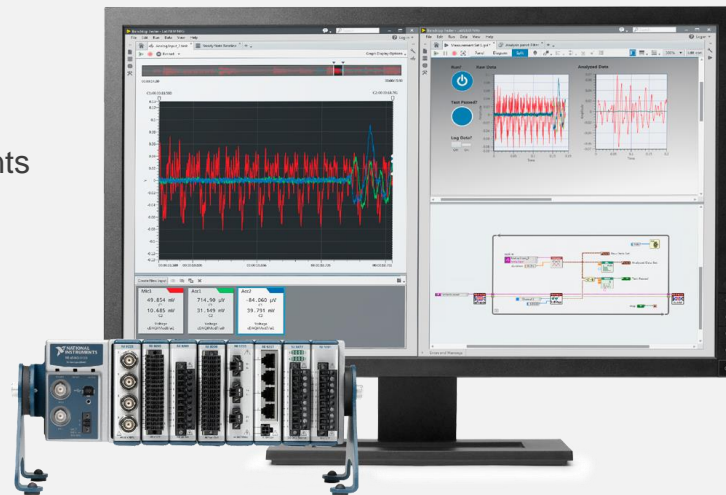
Integrate Hardware. Visualize Data. Accelerate Engineering.

Instantly Connect to Measurement Hardware

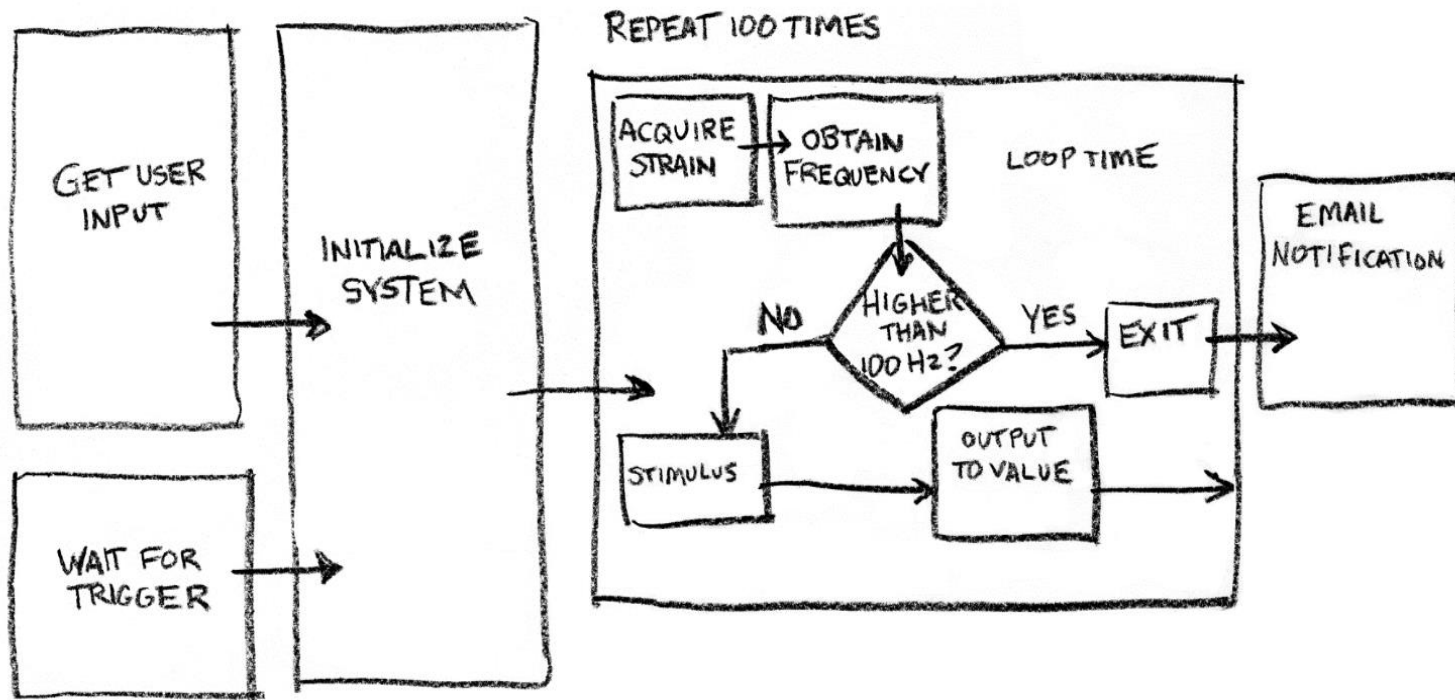
Customize and Repeat Measurements to Meet Application Requirements

Make Data-Based Decisions Faster Through Instant Insights

Automate Saving and Reporting Data

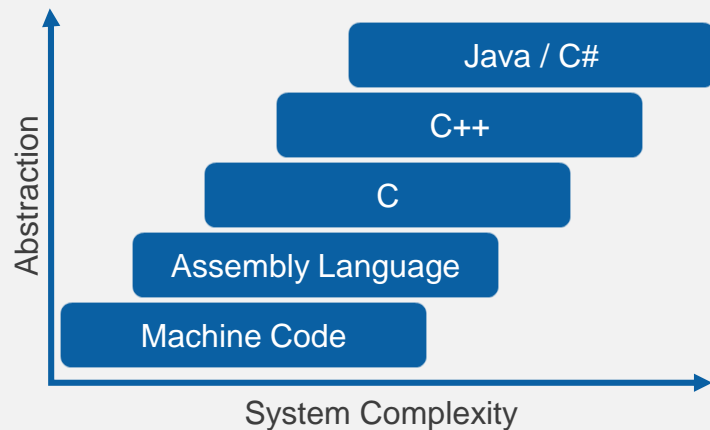


Customize With Graphical Programming



Examining Traditional Source Code

Humans use abstracted languages because machine code is too hard to comprehend



```
bool32 CanProbeSignal(OHHandle h, ObjID s)
{
    ObjList *lp;
    ObjID tl, t = 0;
    initil *tdp=NULL;
    InstrHandle vi;
    if(s)
    {
        tl= SignalPtr(h,s)->termList;
        Disassert(tl, 0);
        lp= ObjListPtr(h, tl);
        t= lp->obj[0] / lp->obj[0] : 0;
    }
    if(!t)
        return FALSE;
    tdp= TDPtrFromID(h, oGetDataType(h, t));
    vi = HeapPtr(h);
    return DefinedType(tdp) && ((vi)->instrState & viDebugCapable)
        && !((vi)->flags & parallelVMask) && !((vi)->instrState & viRetrieveMask)
        || !((vi)->retrieve)->wasAdding();
}

int32 SelectPopUpMethod(OHHandle h, ObjID s, Args *ap)
{
    int32 reply= 0;
    if (reply = SelectSupPopUp(h, s, ap))
        return reply;
    ap->popup.level++;
    if (ap->popup.doWhat == kBuildPopUp)
    {
        Str255 buff;
        int32 i;
        AppendDiagramListMenu(h, s, ap->popup.level, ap->popup.menu, FALSE);
        if (lvConfigSettings.autoInitSelectFeatureEnabled)
        {
            InsertObjMenuItem(ap->popup.level, ap->popup.menu, NULL, 0, -1);
            GetPopUpStringInSelNodeAutoInit, buff);
            i = InsertObjMenuItem(ap->popup.level, ap->popup.menu, buff, miSelNodeAutoInit, -1);
            MCheckItem(ap->popup.menu, i, (SelNodePtr(h,s)->flags & autoKeInitSelMask));
        }
    }
    else if (ap->popup.doWhat == kSelectPopUp)
        reply= SelPopUpSelect(h, s, ap, FALSE);
    return reply;
}
```


We Live in a Graphical, Parallel World

Our World

Gantt Chart



Football Play



Musical Score



A World Without Graphical

Begin Project

Simultaneously Begin Tasks A and B

When Task A Ends,

Simultaneously Begin Tasks C, D, and H

When Tasks B and C Both End,

Begin Task E

When Task D Ends,

Align in Split-Back Formation

Center Hikes Ball to Quarterback

Simultaneously,

Center Blocks Defensive Tackle

Quarterback Hands Ball to Tailback

Offensive Tackles 1-4 Block Defensive End

Wide Receiver Right Runs In Route

Begin Song

Rest Two Beats in $\frac{3}{4}$ Time

While Three Iterations Haven't Been Played,

Left Hand Plays Low C, G, and Middle C

And Right Hand E, G, and High C

Hold for Two Beats

Pause for One Beat

...But what if everything was represented using sequential, textual syntax?

CompactDAQ Hardware



CompactDAQ Hands-On

Part 1: Getting Started (mandatory)

Hardware Configuration.....	4
Explore the Example Finder.....	14

Part 2: Choose Your Own Adventure (optional)

Temperature Measurement and Logging.....	23
Measuring Vibration from an Accelerometer.....	47

Wrap Up

Goals of Today

1. Learn how to understand and calculate your NI or third-party hardware data acquisition system's accuracy.
2. Understand the importance of collecting data in a logical, well documented way and know where to get more information.
3. Get hands-on with different software and the NI CompactDAQ system

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