System building is like Symphony writing

What we can learn from Beethoven
“Beethoven is first and foremost a builder.”

— Leonard Bernstein
1. Don’t repeat yourself

Every symphony from Beethoven is a breakthrough from earlier ones
2. Leverage empirically proven techniques
a.k.a. “stand on the shoulder of the giants”

The sonata form

Exposition | Development | Recapitulation

A: I | B: V | V | V and other keys | A: I | B: I

(minor: III or V  III or V)
3. Not afraid of breaking rules

Opening of Symphony No. 1 in C Major (1800)
4. Embrace new hardware
5. Know hardware really well

Played by two E flat horns in Exposition

Played by two Bassoons in Recapitulation

The Natural Horn had a limited range of notes. Horn players in the 1800s found ways of overcoming these limitations. By moving one hand in the bell they could get extra notes between the basic tones, or harmonics. Different lengths of crooks inserted into the horn put the horn into different keys.
6. There is always a way to overcome one’s personal limitation
7. A good design is discovered, not conceived

- The value of trial-and-error

- It is much easier to verify if an idea is good than coming up a good one.
“You see, a lot of us assume, when we hear the symphony today, that it must have spilled out of Beethoven in one steady gush, clear and right from the beginning. But not at all. Beethoven left pages and pages of discarded material, similar to these, in his own writing, enough to fill a sizable book. The man rejected, rewrote, scratched out, tore up, and sometimes altered a passage as many as twenty times.”

—— Leonard Bernstein
(American Conductor and Composer of the 20th century)
These are manuscripts sent to copyists, no drafts
https://www.youtube.com/watch?v=yj2-G0RdiOl
System researchers are artists, 
NOT construction workers

We create new things that inspire awe
“Everything is a file”