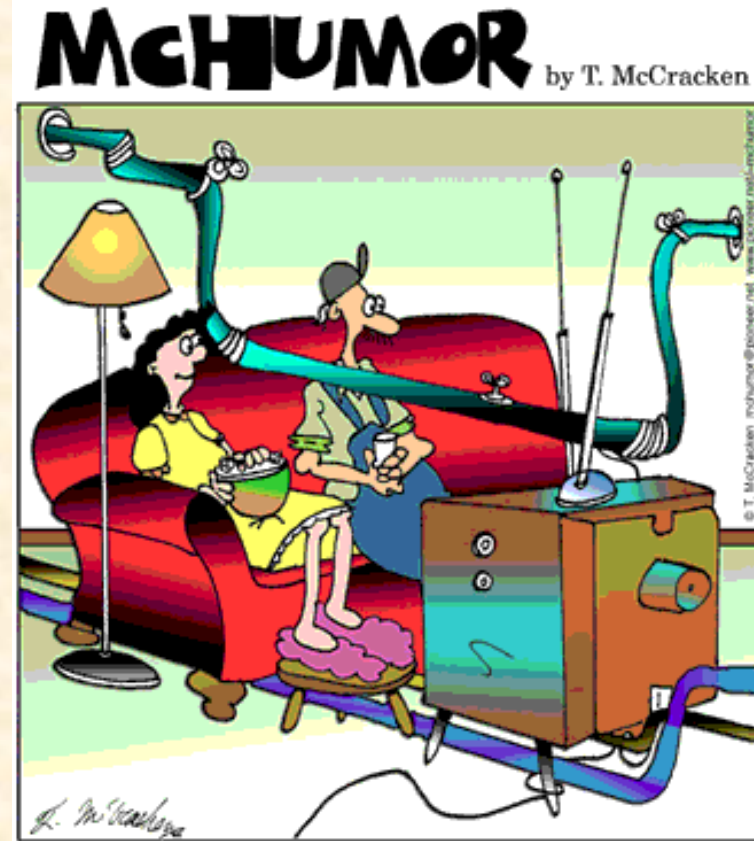


XAL Online Model Upgrade Plans

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The Situation

- At SNS the online model has seen little maintenance since its inception
- However, many important features have been added – many important apps depend upon these
 - Phase slip calculation
 - Closed orbit calculation
 - Dipole path length dependency
- Many of these modifications were done outside the architecture of the online model
- We are left with a brittle implementation of an important component of XAL



Why it's bad when home owners change their minds about the bathroom's location late in a building project.

However...

Development Continued at J-PARC

SNS Online Model

- **Bending dipole**
 - Added path length changes
- **Phase slip**

J-PARC Online Model

- **Added SNS bending dipole**
 - Corrected model
- **Corrected space charge cal.**
- **Corrected RF gap dynamics**
- **Added PMQ magnets**
- **Added RF gap emit. growth**
- **Greatly enhanced Javadoc**
- **Added reverse propagation**
- **Verification and testing**
 - Many bug fixes
- **Extensive refactoring**
 - More robust and maintainable
 - A factor 2 speed increase

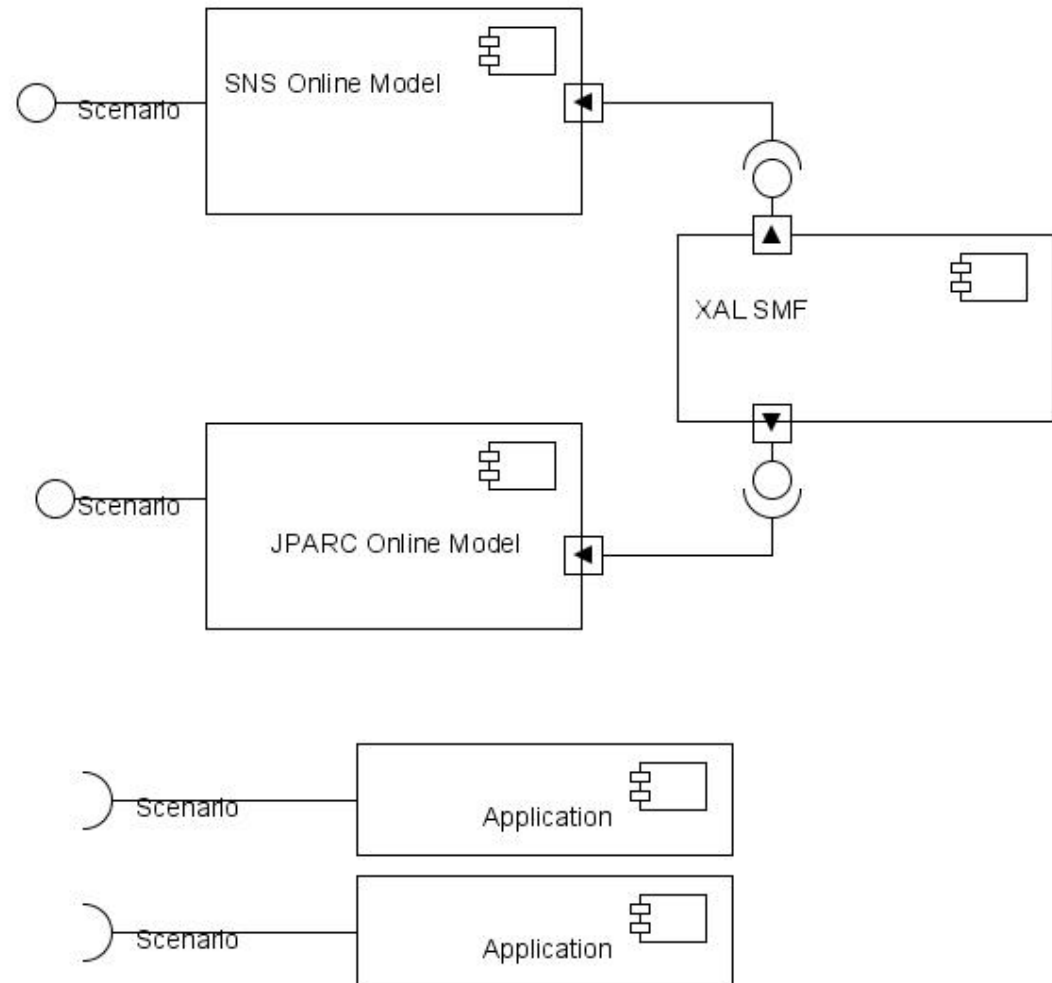
Status

- **We must be able to add features to the model as necessity dictates**
 - Side effects are occurring because of the coupled nature of earlier modification
- **J-PARC has a much more robust online model with many more features**
 - Unfortunately J-PARC is no longer collaborating (at least at present)
 - Yet, they have offered their source code to the community



The Good News

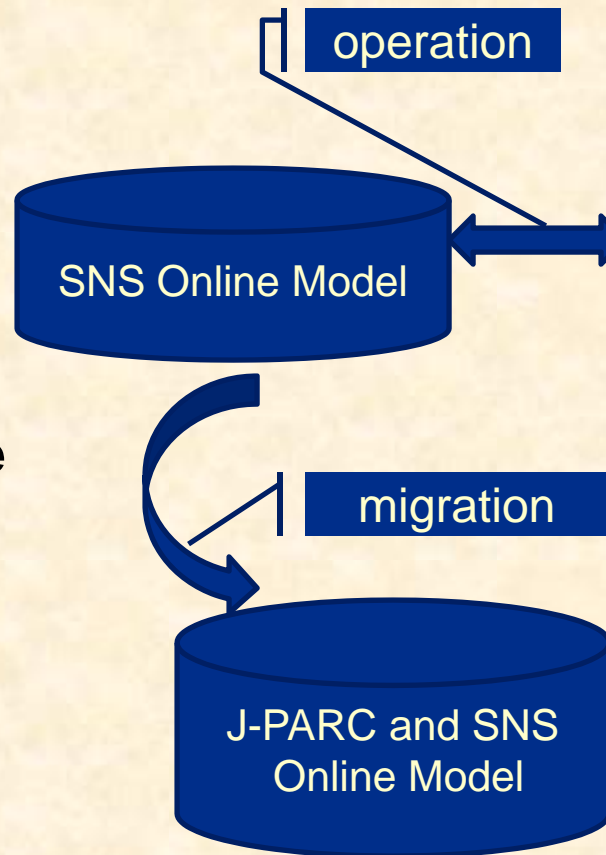
- The JPARC online model presents the same interface as the standard (SNS) version.
 - It should be possible to do a wholesale replacement
- There are differences however.
 - Different beam models
 - Architecture is different
 - Some behavioral differences (changed to be consistent with physics community definitions)
- We can install the JPARC online model along with the SNS online model - simultaneous availability.
- Test existing applications and move to new online model when comfortable.



Online Model Deployment Plan

Online Model Upgrade

- Maintain working “operational” version
- Migrate J-PARC version concurrently into repository
- Once all application are safely free from side effects we can drop the SNS version



One last thing...

- **The Online Model Lattice Generator**
 - The component that generates a modeling Scenario given an accelerator hierarchy data structure (SMF)
 - This component has been a bane for many years and needs to be replaced.
 - Tightly coupled with both SMF and online model
 - No configuration capabilities
 - Destroys the hierarchy of SMF
 - It's been on my TODO list for three years now.