

Model Documentation Tiers

A Practical Guide



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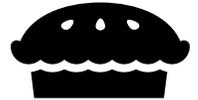
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INTRODUCTION

In a perfect world, where everyone has infinite time, all models would be documented extensively enough to be replicated. Unfortunately, time is not infinite, so for the sake of efficiency, Nationwide Enterprise Model Risk Management categorizes models into one of three tiers. The tier 1 models are those that have the highest material impact on Nationwide's business interests. They are also often the most complex models, and thus, they need to be documented thoroughly. Tier 3 models have the least business impact and are often not complex, and tier 2 models fit somewhere in the middle. This document demonstrates how the tiering system works at Nationwide Insurance and offers examples and explanations of documentation variation across tiers.

You can think of the tiering process a little bit like documenting your grandmother's famous apple pie recipe. A fully documented, tier 1 recipe will be the one you publish in a cookbook. You'd include pictures of key steps in the process, a list of ingredients, a detailed description of how to complete the recipe, and maybe even nutrition information. A tier 2 recipe might be the one you share with friends on a recipe card. It might include the ingredients and process steps, and perhaps a photo of the finished product, but it won't be nearly as detailed. A tier 3 recipe is one that you jot down briefly for a friend just to give them a sense of how pies are made – you'll describe the process briefly, assuming that this friend doesn't need every single detail in order to understand pies. While financial models are not pie, thinking of documentation as a recipe can be a useful way to understand model tier variation.



COMPARING TIERS

The difference in documenting your model based on its tier is a matter of depth and detail. Tier 1 model documentation is as detailed and deep as possible; the goal is to give another person the tools to thoroughly reproduce the model. Tier 2 model documentation is about half as deep and detailed as Tier 1, and it should allow a user to substantially reproduce the model, though some sections may be more descriptive. Tier 3 model documentation is briefer and more general; it should offer the user a description of the major components of the model. In some sections, the depth and detail of the model documentation will be the same across all tiers. In other sections, however, these amounts may vary depending on the model and the subsection being drafted.

Figure – Documentation Style by Tier



In general, Tier 1 model documentation tends to be more instructive, allowing for material reproducibility, while Tier 3 model documentation tends to be more descriptive. Tier 2 document is a blend of instruction and description.

CATEGORIES THAT REMAIN THE SAME ACROSS TIERS

- Model Overview
- Model Uses
- Model Requirements
- Model Alignment
- Model Testing And Model Controls
- Document Version Control

These sections all contain primary descriptive, non-judgmental information, so the facts will be delivered with the same robustness regardless of tier. In general, here are some best practices to apply to your model documentation as a whole:

- Avoid describing complex math using only words. Instead, insert a formula *and* add a description that helps a reader understand the intended function.
- Begin each section with a plain English sentence or paragraph introducing the content in that section. This high level explanation should be understandable to anyone, even if they are not familiar with your model.
- In general, write in direct, simple sentences.
- Comment your code using plain English – while some people can read the code, it becomes much more usable with thoughtful comments.
- Spell out acronyms.

CATEGORIES THAT VARY ACROSS TIERS

- Data
- Methodology
- Assumptions
- Process and Execution

These categories vary across tiers because the information in these sections do not carry equal importance across tiers. Remember, the goal with tier 1 documentation is to offer enough information to reproduce a model completely, whereas tier 3 document needs only to describe it. These three sections contain the information most important to running the model, so the quantity of information provided can and will vary across tiers. For tier 2 and 3 models, most audiences of the documentation will not need a full understanding of data, methodology, and assumptions. Additionally, because each of these categories contain detail and inputs that are not relevant to all parts of the entire model, those details are what can be left out of tier 2 and 3 model documentation.

FEATURES OF VARIATION

There are five main features that vary across tiers:

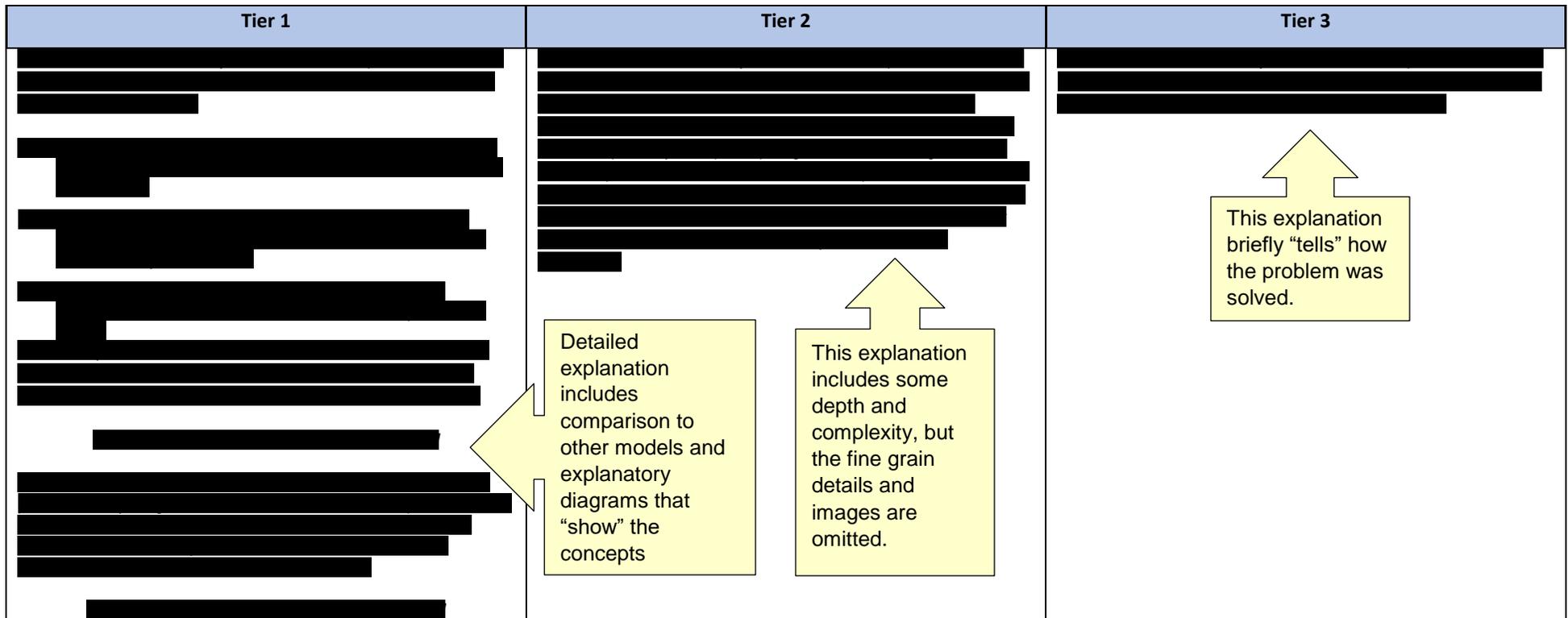
- Depth and Complexity
- Use of Visuals
- References
- Mathematical Formulas and Code Sources
- Instructions

Depth and Complexity

Depth and complexity could be explained as a “show and tell” measure. Deep, complex documentation both shows a user how it works and explains the details. In general, tier 1 documentation both shows data, methodology, and assumptions AND tells the reader how to enact them. Tier 2 documentation leans more heavily on description, though it does demonstrate. Tier 3 documentation is nearly all “tell,” relying on description rather than demonstration to communicate the process. This is the most shallow level of documentation.

For example, a recipe can tell you to remove the pie from the oven when it is done, but what if you’re not sure how to tell that it’s done? A complex, deep recipe might show you how to know when to remove a pie from the oven by including description of the crust texture of the pie, how it should smell, and what color it should be, perhaps even including pictures. Depending on how important it is the reader gets the recipe just right, you can choose which level of depth and complexity to include.

The example below is from the process section of a model documentation methodology. It explains how a problem was solved. For brevity’s sake, diagrams have been removed and replaced with bracketed explanatory text.



References

Model development includes consideration of reference materials that may inform decisions, and support for modeling choices is a documentation requirement. In tier 1 model documentation, white papers, articles, and other references are explained in extensive detail, describing how they relate to the model in addition to including a link. Examples may even be included to further explain the choice. In tier 2 model documentation, the description is briefer, and a link is included. In tier 3 documentation, a link and a sentence or two of contextualizing information will suffice.

You'll notice this delineation in the table below, which is an excerpt from a Methodology and Assumptions overview section. Note that in each tiering example, there is a link. The difference is in the level of description of the reference and how it relates to the model.

Tier 1	Tier 2	Tier 3
[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]

This Tier 1 documentation includes an example.

An extensive explanation of the no-arbitrage principle and how it applies here.

Tier 2 includes a general description, but not nearly as extensive as Tier 1.

All three tiers include a link.

Mathematical Formulas and Code Sources

Non-English language is often used in model documentation, so this section deals with the two most common forms: math and code. First, we'll address the code. Not all models have computer code, but when code is an important part of your model, it's vital to comment it carefully. It is never appropriate to just direct a reader to read raw code, as good comments make it easier for the reader to understand. For all tiers of documentation, include a link to your source code. For Tier 1, also include a full description of what's being done, any relevant mathematical functions, and a snippet of code as a demonstration or reference. For Tier 2, you may omit the code snippet, but still describe what's being done and how it relates to the math. For Tier 3 documentation, a brief description of the code will suffice.

Next, we discuss the math. Tier 1 documentation includes both mathematical formulas and descriptions of the math. Tier 2 documentation uses formulas to demonstrate the key mathematical functions in the model, but may opt to describe simpler, secondary functions with plain English. Tier 3 documentation uses formulas only briefly. If the math is simple, it can simply be described with words. Below you can find an example of the same functional form modified to demonstrate the three tiers of documentation.

Tier 1	Tier 2	Tier 3
<p>[Redacted text]</p>	<p>[Redacted text]</p>	<p>[Redacted text]</p>

Formulas are included in each step of Tier 1 documentation.

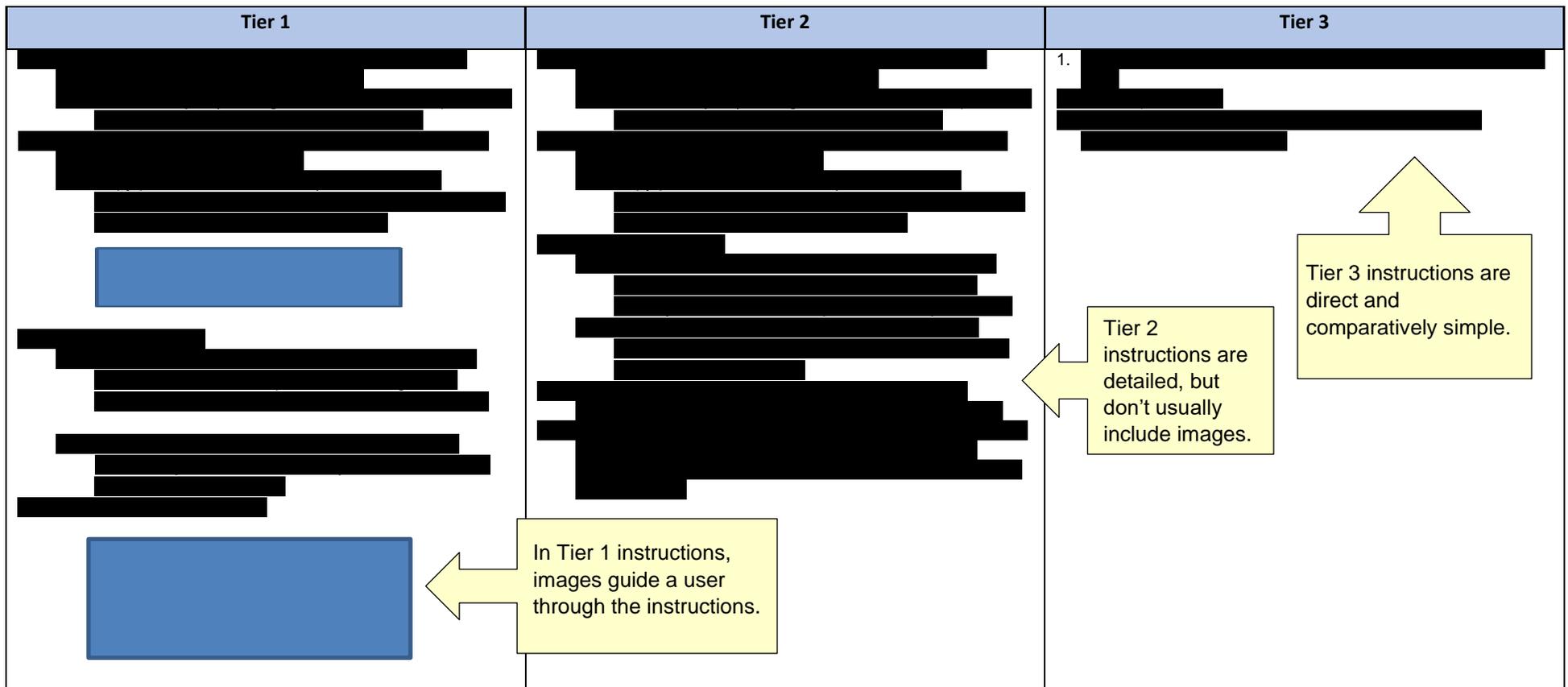
Formulas are only included for key steps in Tier 2 documentation. Other steps are described.

Tier 3 documentation describes the math with plain language.

Instructions

Instructions apply mainly to the process and execution section of model documentation, which includes the Model Execution Process or User Guide. Tier 1 instructions are detailed the most fully. They'll include screenshots, cell names, and highly detailed information that will allow a user to replicate a model process. Tier 2 instructions may include some screenshots and details for the most complex parts of the model, but the simpler parts might just have summarized instructions (such as "create pivot table"). Tier 3 instructions will be the least deep and complex, offering basic instructions so that a reader can understand how the process works but not necessarily replicate it.

The example below is an excerpt that explains how to update a workbook with fresh data. You'll note that the Tier 1 instructions include annotated screenshots that help a user navigate the many parts of the workbook. Tier 2 documentation is detailed but doesn't lean so heavily on visual guides. Tier 3 instructions are a simple summary.



CONCLUSION + RESOURCES

This document gives you a general understanding of how model documentation expectations are divided into three tiers at Nationwide. Below you can find more resources to further your understanding and help you apply these expectations to your own documentation.

Resource	Description
Fully Tiered Sample (Albert ESG)	This is a document that demonstrates the differences in tiers by taking a Tier 1 model and showing how the documentation will change for Tiers 2 and 3 documentation.
Model Documentation Template	You can use this template to begin documenting your model. It includes helper text that describes what to include in each section.
Model User Guide Template	You can use this template to get your user guide documentation started. It includes a template for a process flow diagram.
Model Requirements Template	This template will help you draft your model requirements page.
Risk & Control Matrix Template	You can use this to draft your Risk and Control Matrix.
MRM Style Guide	This style guide was developed to help you write effective model documentation.
Plain Language Guide	This guide, published by the U.S. Government, will help you refine your language and write easier to understand text.

DOCUMENT VERSION CONTROL

Record changes that have been made since the last published version. The version number of the document should be updated after each official release for review or signoff.

Version:	Date:	Description:	Editor Name:
1.0	7/17/19	Initial Draft	Paula Miller
1.1			
1.2			