

# Infrastructure-as-Code best practices checklist for code review

## Survey goal:

In this project, we try to identify a checklist of elements that developers and reviewers should consider when changing and reviewing Infrastructure-as-Code (IaC) scripts such as Ansible and Puppet configuration files. To do so, we manually studied a large number of IaC changes in OpenStack and came up with a list of 7 distinct categories encompassing 36 best practices that reviewers recommend when reviewing IaC related changes.

**Survey participation:** We kindly request your participation in evaluating these identified best practices based on a likert scale from "*I totally disagree*" to "*I totally agree*". Additionally, if you have any feedback regarding missing best practices, suggestions for improvements, or any other comments, please feel free to share them in the **"any comment"** text field. We estimate that the survey will require approximately 10 to 15 minutes of your time.

Your invaluable contribution to this research is greatly appreciated, and it will significantly enhance our understanding of IaC best practices.

## Voluntary Survey Participation:

Participation in this survey is entirely voluntary, and you have the option to decline participation if you wish. You are free to discontinue your participation at any point by leaving any remaining questions unanswered, and you are not obligated to provide a reason for your decision.

**Confidentiality:** Please be assured that your responses will remain completely anonymous and confidential. They will be used solely for statistical analysis and will be examined in an aggregated and anonymous format.

**Contact:** If you have any question, please contact Narjes Bessghaier at: [narjes.bessghaier.1@ens.etsmtl.ca](mailto:narjes.bessghaier.1@ens.etsmtl.ca)

Thank you in advance for your participation.

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\* Indicates required question

## Demographic questions

Please provide us with some information regarding your experience in software development, IaC, and code review.

1. **Education:** What is your highest degree? \*

Mark only one oval.

- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Professional degree
- ☐ Engineering degree
- ☐ Doctorate degree
- ☐ Other: \_\_\_\_\_

2. **Experience:** How many years of experience do you have in software development? \*

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3. **Experience:** How many years of experience do you have with OpenStack? \*

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4. **Experience:** How many years of experience do you have in code review? \*

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5. **Experience:** How many years of experience do you have with Infrastructure-as-Code (IaC)? \*

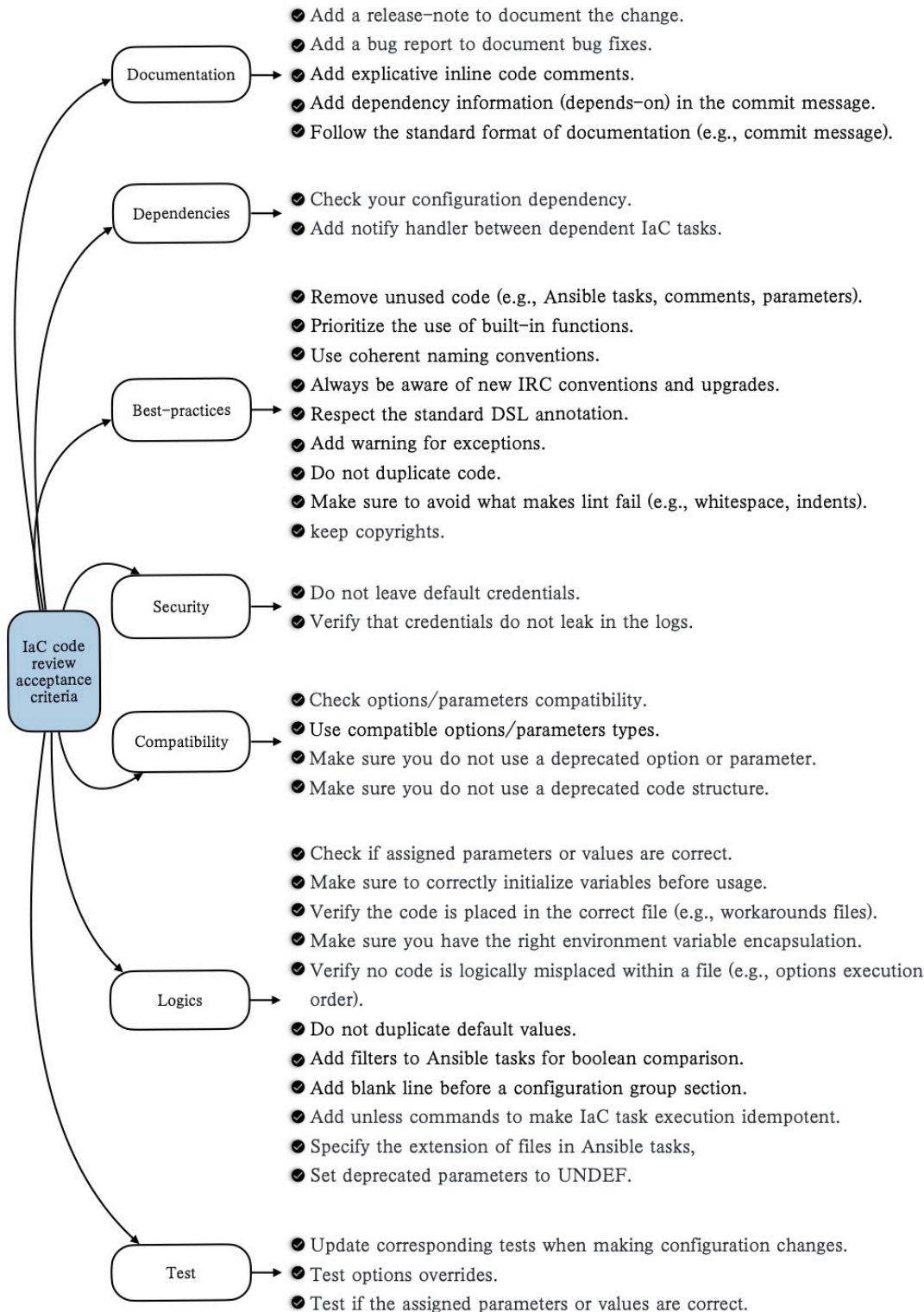
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### IaC best practices Checklist

In the following, we present you with the IaC best practices checklist.

We request you to evaluate every practice for every category, following a 4 points likert scale ("I totally disagree", "I somewhat disagree", "I somewhat agree", "I totally agree").

Additionally, if you have any feedback regarding missing best practices, suggestions for improvements, or any other comments, please feel free to share them in the **"any comment"** text field.



## 6. Category 1: Documentation \*

Mark only one oval per row.

	I totally disagree	I somewhat disagree	I somewhat agree	I totally agree
Add a release-note to document the change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add a bug report to document bug fixes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add explicative inline code comments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add dependency information (depends-on) in the commit message.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Follow the standard format of documentation (e.g., commit message).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Do you have any comment on the "Documentation" category

8. Do you agree on referring to this category as "Documentation"?

9. **Category 2: Dependencies** \*

Mark only one oval per row.

	I totally disagree	I somewhat disagree	I somewhat agree	I totally agree
Check your configuration dependency.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Add notify handler between dependent IaC tasks.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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10. Do you have any comment on the "**Dependencies**" category


11. Do you agree on referring to this category as "**Dependencies**"?


12. **Category 3: Best practices** \*

Mark only one oval per row.

	I totally disagree	I somewhat disagree	I somewhat agree	I totally agree
Remove unused code (e.g., Ansible tasks, comments, parameters).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prioritize the use of DSL built-in functions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use coherent naming conventions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Always be aware of new IRC conventions and upgrades.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Respect the standard DSL annotation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add warning for exceptions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do not duplicate code.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make sure to avoid what makes lint fail (e.g., whitespace, indents).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
keep copyrights.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Do you have any comment on the "Best practices" category

14. Do you agree on referring to this category as "Best practices"?

15. **Category 4: Security\***

Mark only one oval per row.

	I totally disagree	I somewhat disagree	I somewhat agree	I totally agree
Do not leave default credentials.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verify that credentials do not leak in the logs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Do you have any comment on the "Security" category

17. Do you agree on referring to this category as "Security"?

18. **Category 5: Compatibility** \*

Mark only one oval per row.

	I totally disagree	I somewhat disagree	I somewhat agree	I totally agree
Check options/parameters compatibility.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use compatible options/parameters types.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make sure you do not use a deprecated option or parameter.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make sure you do not use a deprecated code structure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Do you have any comment on the "Compatibility" category

20. Do you agree on referring to this category as "Compatibility"?



21. **Category 6: Logics** \*

Mark only one oval per row.

	I totally disagree	I somewhat disagree	I somewhat agree	I totally agree
Check if assigned parameters or values are correct.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make sure to correctly initialize variables before usage.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verify the code is placed in the correct file (e.g., workarounds files).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Make sure you have the right environment variable encapsulation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verify no code is logically misplaced within a file (e.g., options execution order).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do not duplicate default values.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Add filters to Ansible tasks for boolean comparison.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add blank line before a configuration group section.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Add unless commands to make IaC task execution idempotent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Specify the extension of files in Ansible tasks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Set deprecated parameters to UNDEF.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Do you have any comment on the "Logics" category

23. Do you agree on referring to this category as "Logics"?

24. **Category 7: Test**\*

Mark only one oval per row.

	I totally disagree	I somewhat disagree	I somewhat agree	I totally agree
Update corresponding tests when making configuration changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Test options overrides.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Test if the assigned parameters or values are correct.

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25. Do you have any comment on the "Test" category

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26. Do you agree on referring to this category as "Test"?

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