I want to take a look at some ancient problems – addressed by the Stoics, Aristotle, Ockham – which people still worry about today. They have to do with the relationship between time and necessity, and will help to motivate a semantic model that combines tense with modality.

Let's start with Diodorus Cronus's Master Argument.

(A) Everything that is past and true
(B) The impossible does not follow from the possible
(C) Hence, the possible is that which either is or will be

Premise (A) expresses the intuition that time is asymmetric: the future is open, but the past is closed. In other word, claims about the past are fixed, unalterable, necessarily true. The paradox that comes out is that the intuition doesn't work: if you say the past is fixed, you will have to say the future is fixed too. Premise (B) means the following: if you can deduce an impossibility from something, that shows that the thing you started with wasn't possible. And the conclusion (C) says that there are no things that are possible that won't happen, i.e. there are no proposition about the future that are not true.

How you get the conclusion from the premises is not so clear, but I think the rough idea is the following. Suppose that p will be true at some future time. Then it was true in the past that p would be true, and since what is past is necessary, it was necessary that p would be true. But what is once necessary remains necessary, it must be now necessary that p will be true. So whatever will happen must happen.

But despite this argument, we seem to be able for form a coherent conception of a world in which the past is fixed, but the future open. We can represent such a conception graphically as a tree:

From any point, there are many ways forward but there is only one way back. So it is linear in the direction towards the past but non-linear in the direction towards the future. So we can build a frame for tense logic based on this structure.

Here is what Aristotle says:

"If a thing is white now, it was true before to say that it would be white, so that of anything that has taken place, it was always true to say 'it is' or 'it will
be'. But if it was always true to say that a thing is or will be, it is not possible
that it should not be or not be about to be, and when a thing cannot not come
to be, it is impossible that it should not come to be, and when it is impossible
that it should not come to be, it must come to be."

Many people interpret Aristotle as saying that future statements are neither true nor
false. But then he also says this: "It is an irrefragable law that of every pair of
contradictory propositions ... one must be true and the other false." So either "there
will be a sea battle tomorrow" is true or "there will not be a sea battle tomorrow" is.
Furthermore, he says "since propositions corresponds with facts, it is evident that
when in future events there is a real alternative, and a potentiality in contrary
directions, the corresponding affirmation and denial have the same character... One
of the two propositions in such instances must be true, and the other false, but we
cannot say determinately that this or that is false, but must leave the alternatives
undecided."

Now the question here is whether the final statement should be understood in an
epistemic way: we can't know which it is going to be but it is still going to be one
way or the other. If so then we have the problem, since the problem is not about
knowledge, but about truth. People tell you: maybe Aristotle is really saying that it
has got to be one way or the other but it's indeterminate which. But how do you
make sense of that?

Let us see what Ockham has to say:

"Some propositions about the present as regards both their wording and their
subject matter. Where such propositions are concerned, it is universally true
that every true proposition about the present [corresponds to] a necessary
proposition about the past. Other propositions are about the present as
regards their wording only and are equivalently about the future, since their
truth depends on propositions about the future."

This quotation shows his attempt to distinguish between the semantic structure of
the statement and the statement itself. Ockham's insight is that when we talk about
a past tense statement, we may talk about something in the past, but we may also
talk about something in the future, even though the form of the statement is past
tensed. If I say "it was the case that there will be a sea battle tomorrow", that
statement follows from the statement that there will be a sea battle tomorrow. So
"there will be a sea battle tomorrow" is equivalent to "it was true yesterday that
there would be a sea battle in two days." Thus, statements about the future are
equivalents with those that result from adding a past tense. The point is, when you
ask yourself whether the statement is about the past or the future, don't look at the
F's and the P's, look at what it means.
Consider the tree again.

Suppose the present is $w_0$. Suppose a sea battle is part of $h_1$ but not part of $h_2$. Then the truth of "there will be a sea battle" at $w_0$ depends on the future of $w_0$, but it also depends on the future of $w_1$ – the past of $w_0$ – in exactly the same way. So putting a P in front of the statement will not change anything in this case.

See handout "Note on branching time" for the attempt to make formal sense of these issues.