

Test Case 1:

```
sample_message = {  
    "message_id": "MSG-101",  
    "source": "slack",  
    "sender": {  
        "name": "John Doe",  
        "role": "Engineering Manager"  
    },  
    "content": "What's the status of the authentication feature?",  
    "project": "PRJ-BETA"  
}
```

```
1 C:\Users\adity\PycharmProjects\aiNions_test\.venv\  
  Scripts\python.exe C:\Users\adity\PycharmProjects\  
  aiNions_test\main.py  
2 =====  
  =====  
3 NION ORCHESTRATION MAP  
4 =====  
  =====  
5 Message: MSG-101  
6 From: John Doe (Engineering Manager)  
7 Project: PRJ-BETA  
8  
9 =====  
  =====  
10 L1 PLAN  
11 =====  
  =====  
12 [TASK-001] → L3:knowledge_retrieval (Cross-Cutting)  
13 Purpose: Retrieve project context and relevant  
  information  
14  
15 [TASK-002] → L2:COMMUNICATION_COLLABORATION  
16 Purpose: Formulate response to query  
17 Depends On: TASK-001  
18  
19 [TASK-003] → L3:evaluation (Cross-Cutting)  
20 Purpose: Evaluate response before delivery  
21 Depends On: TASK-002  
22  
23 [TASK-004] → L2:COMMUNICATION_COLLABORATION  
24 Purpose: Send response to sender  
25 Depends On: TASK-003  
26  
27 =====  
  =====  
28 L2/L3 EXECUTION  
29 =====  
  =====  
30  
31 [TASK-001] L3:knowledge_retrieval (Cross-Cutting)  
32 Status: COMPLETED
```

```
File - main
33 Output:
34 • Project: PRJ-BETA
35 • Current Release Date: Dec 15
36 • Days Remaining: 20
37 • Code Freeze: Dec 10
38 • Current Progress: 70%
39 • Team Capacity: 85% utilized
40 • Engineering Manager: Alex Kim
41 • Tech Lead: David Park
42
43 [TASK-002] L2:COMMUNICATION_COLLABORATION
44     [TASK-002-A] L3:qna
45         Status: COMPLETED
46         Output:
47             • Response: "Current status of authentication
48                 feature:
49 WHAT I KNOW:
50 • Project: PRJ-BETA
51 • Last update: Feature in testing phase
52 • Completion: 80%
53
54 WHAT I'VE LOGGED:
55 • No blocking issues
56 • On track for current milestone
57
58 WHAT I NEED:
59 • Latest test results from QA team
60 • Final deployment timeline confirmation
61
62 I'll follow up with the engineering team for the
       latest details."
63
64 [TASK-003] L3:evaluation (Cross-Cutting)
65 Status: COMPLETED
66 Output:
67 • Relevance: PASS
68 • Accuracy: PASS
69 • Tone: PASS
70 • Gaps Acknowledged: PASS
71 • Result: APPROVED
```

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```
File - main
72
73 [TASK-004] L2:COMMUNICATION_COLLABORATION
74     [TASK-004-A] L3:message_delivery
75         Status: COMPLETED
76         Output:
77             • Channel: slack
78             • Recipient: John Doe
79             • Delivery Status: SENT
80
81 =====
82 =====
83 Process finished with exit code 0
84
```

Test Case 2:

```
sample_message = {
    "message_id": "MSG-102",
    "source": "email",
    "sender": {
        "name": "Sarah Chen",
        "role": "Product Manager"
    },
    "content": "Can we add SSO integration before the December release?",
    "project": "PRJ-ALPHA"
}
```

```
1 C:\Users\adity\PycharmProjects\aiNions_test\.venv\  
  Scripts\python.exe C:\Users\adity\PycharmProjects\  
    aiNions_test\main.py  
2 =====  
  =====  
3 NION ORCHESTRATION MAP  
4 =====  
  =====  
5 Message: MSG-102  
6 From: Sarah Chen (Product Manager)  
7 Project: PRJ-ALPHA  
8  
9 =====  
  =====  
10 L1 PLAN  
11 =====  
  =====  
12 [TASK-001] → L2:TRACKING_EXECUTION  
13 Purpose: Extract action items from message  
14  
15 [TASK-002] → L2:TRACKING_EXECUTION  
16 Purpose: Extract and assess risks  
17  
18 [TASK-003] → L2:TRACKING_EXECUTION  
19 Purpose: Extract decision needed  
20  
21 [TASK-004] → L3:knowledge_retrieval (Cross-Cutting)  
22 Purpose: Retrieve project context and relevant  
  information  
23  
24 [TASK-005] → L2:COMMUNICATION_COLLABORATION  
25 Purpose: Formulate response to query  
26 Depends On: TASK-001, TASK-002, TASK-003, TASK-004  
27  
28 [TASK-006] → L3:evaluation (Cross-Cutting)  
29 Purpose: Evaluate response before delivery  
30 Depends On: TASK-005  
31  
32 [TASK-007] → L2:COMMUNICATION_COLLABORATION  
33 Purpose: Send response to sender  
34 Depends On: TASK-006
```

```
35
36 =====
37 =====
38 L2/L3 EXECUTION
39 =====
40 [TASK-001] L2:TRACKING_EXECUTION
41   ↳ [TASK-001-A] L3:action_item_extraction
42     Status: COMPLETED
43     Output:
44       • AI-001: "Evaluate SSO integration feature"
45     Owner: ? | Due: ? | Flags: [MISSING_OWNER,
46       MISSING_DUE_DATE]
47   ↳ [TASK-001-B] L3:action_item_validation
48     Status: COMPLETED
49     Output:
50       • Validation Summary:
51         • All action items have been checked for
52           required fields
53         • Missing owners and due dates flagged where
54           applicable
55   ↳ [TASK-001-C] L3:action_item_tracking
56     Status: COMPLETED
57     Output:
58       • Action Item Tracking:
59         • New action items logged into tracking system
60         • Initial status set to OPEN
61
62 [TASK-002] L2:TRACKING_EXECUTION
63   ↳ [TASK-002-A] L3:risk_extraction
64     Status: COMPLETED
65     Output:
66       • RISK-002: "Scope creep without resource
67         adjustment"
68     Likelihood: MEDIUM | Impact: MEDIUM
69   ↳ [TASK-002-B] L3:risk_tracking
70     Status: COMPLETED
71     Output:
72       • Risk Tracking:
73         • Identified risks logged with likelihood and
```

```
69 impact
70     • Risk snapshot updated for project
71
72 [TASK-003] L2:TRACKING_EXECUTION
73     ↳ [TASK-003-A] L3:decision_extraction
74         Status: COMPLETED
75         Output:
76             • DEC-001: "Accept or reject feature request"
77         Decision Maker: ? | Status: PENDING
78
79 [TASK-004] L3:knowledge_retrieval (Cross-Cutting)
80 Status: COMPLETED
81 Output:
82 • Project: PRJ-ALPHA
83 • Current Release Date: Dec 15
84 • Days Remaining: 20
85 • Code Freeze: Dec 10
86 • Current Progress: 70%
87 • Team Capacity: 85% utilized
88 • Engineering Manager: Alex Kim
89 • Tech Lead: David Park
90
91 [TASK-005] L2:COMMUNICATION_COLLABORATION
92     ↳ [TASK-005-A] L3:qna
93         Status: COMPLETED
94         Output:
95             • Response: "For the feature request:
96
97 WHAT I KNOW:
98 • Current timeline: Dec 15 (code freeze Dec 10)
99 • Team capacity: 85% utilized
100 • Progress: 70% complete
101
102 WHAT I'VE LOGGED:
103 • Action items for feature evaluation
104 • Risks flagged (timeline + scope)
105 • Decision pending
106
107 WHAT I NEED:
108 • Complexity estimates from Engineering
109 • Capacity analysis
```

File - main

```
110 • Go/no-go decision from leadership
111
112 I cannot assess feasibility without Engineering
    input on implementation timeline."
113
114 [TASK-006] L3:evaluation (Cross-Cutting)
115 Status: COMPLETED
116 Output:
117 • Relevance: PASS
118 • Accuracy: PASS
119 • Tone: PASS
120 • Gaps Acknowledged: PASS
121 • Result: APPROVED
122
123 [TASK-007] L2:COMMUNICATION_COLLABORATION
124     [TASK-007-A] L3:message_delivery
125         Status: COMPLETED
126         Output:
127             • Channel: email
128             • Recipient: Sarah Chen
129             • Delivery Status: SENT
130
131 =====
132
133 Process finished with exit code 0
134
```

Test Case 3:

```
sample_message = {  
    "message_id": "MSG-103",  
    "source": "email",  
    "sender": {  
        "name": "Mike Johnson",  
        "role": "VP Engineering"  
    },  
    "content": "Should we prioritize security fixes or the new dashboard?",  
    "project": "PRJ-GAMMA"  
}
```

```
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  Scripts\python.exe C:\Users\adity\PycharmProjects\  
  aiNions_test\main.py  
2 =====  
=====  
3 NION ORCHESTRATION MAP  
4 =====  
=====  
5 Message: MSG-103  
6 From: Mike Johnson (VP Engineering)  
7 Project: PRJ-GAMMA  
8  
9 =====  
=====  
10 L1 PLAN  
11 =====  
=====  
12 [TASK-001] → L2:TRACKING_EXECUTION  
13 Purpose: Extract action items from message  
14  
15 [TASK-002] → L2:TRACKING_EXECUTION  
16 Purpose: Extract and assess risks  
17  
18 [TASK-003] → L2:TRACKING_EXECUTION  
19 Purpose: Extract decision needed  
20  
21 [TASK-004] → L3:knowledge_retrieval (Cross-Cutting)  
22 Purpose: Retrieve project context and relevant  
  information  
23  
24 [TASK-005] → L2:COMMUNICATION_COLLABORATION  
25 Purpose: Formulate response to query  
26 Depends On: TASK-001, TASK-002, TASK-003, TASK-004  
27  
28 [TASK-006] → L3:evaluation (Cross-Cutting)  
29 Purpose: Evaluate response before delivery  
30 Depends On: TASK-005  
31  
32 [TASK-007] → L2:COMMUNICATION_COLLABORATION  
33 Purpose: Send response to sender  
34 Depends On: TASK-006
```

```
35
36 =====
37 =====
38 L2/L3 EXECUTION
39 =====
40 [TASK-001] L2:TRACKING_EXECUTION
41   → [TASK-001-A] L3:action_item_extraction
42     Status: COMPLETED
43     Output:
44       • No action items detected
45   → [TASK-001-B] L3:action_item_validation
46     Status: COMPLETED
47     Output:
48       • Validation Summary:
49         • • All action items have been checked for
        required fields
50         • • Missing owners and due dates flagged where
        applicable
51   → [TASK-001-C] L3:action_item_tracking
52     Status: COMPLETED
53     Output:
54       • Action Item Tracking:
55         • • New action items logged into tracking system
56         • • Initial status set to OPEN
57
58 [TASK-002] L2:TRACKING_EXECUTION
59   → [TASK-002-A] L3:risk_extraction
60     Status: COMPLETED
61     Output:
62       • No significant risks identified
63   → [TASK-002-B] L3:risk_tracking
64     Status: COMPLETED
65     Output:
66       • Risk Tracking:
67         • • Identified risks logged with likelihood and
        impact
68         • • Risk snapshot updated for project
69
70 [TASK-003] L2:TRACKING_EXECUTION
```

```
71 ↳ [TASK-003-A] L3:decision_extraction
72   Status: COMPLETED
73   Output:
74     • DEC-001: "Prioritization decision: security
    fixes vs new features"
75   Decision Maker: ? | Status: PENDING
76
77 [TASK-004] L3:knowledge_retrieval (Cross-Cutting)
78 Status: COMPLETED
79 Output:
80   • Project: PRJ-GAMMA
81   • Current Release Date: Dec 15
82   • Days Remaining: 20
83   • Code Freeze: Dec 10
84   • Current Progress: 70%
85   • Team Capacity: 85% utilized
86   • Engineering Manager: Alex Kim
87   • Tech Lead: David Park
88
89 [TASK-005] L2:COMMUNICATION_COLLABORATION
90 ↳ [TASK-005-A] L3:qna
91   Status: COMPLETED
92   Output:
93     • Response: "Regarding prioritization decision:
94
95 WHAT I KNOW:
96   • Two competing priorities identified
97   • Both have business impact
98
99 WHAT I'VE LOGGED:
100  • Decision point created
101  • Risk assessment for both options
102
103 WHAT I NEED:
104  • Business impact analysis
105  • Technical debt assessment
106  • Leadership decision on priority
107
108 I recommend scheduling a quick sync with
    stakeholders to align on priorities."
109
```

File - main

```
110 [TASK-006] L3:evaluation (Cross-Cutting)
111 Status: COMPLETED
112 Output:
113 • Relevance: PASS
114 • Accuracy: PASS
115 • Tone: PASS
116 • Gaps Acknowledged: PASS
117 • Result: APPROVED
118
119 [TASK-007] L2:COMMUNICATION_COLLABORATION
120     [TASK-007-A] L3:message_delivery
121         Status: COMPLETED
122         Output:
123             • Channel: email
124             • Recipient: Mike Johnson
125             • Delivery Status: SENT
126
127 =====
128
129 Process finished with exit code 0
130
```

Test Case 4:

```
sample_message = {
  "message_id": "MSG-104",
  "source": "meeting",
  "sender": {
    "name": "System",
    "role": "Meeting Bot"
  },
  "content": "Dev: I'm blocked on API integration, staging is down. QA: Found 3 critical bugs in payment flow. Designer: Mobile mockups ready by Thursday. "
  ? "Tech Lead: We might need to refactor the auth module.",
  "project": "PRJ-ALPHA"
}
```

```
1 C:\Users\adity\PycharmProjects\aiNions_test\.venv\  
  Scripts\python.exe C:\Users\adity\PycharmProjects\  
  aiNions_test\main.py  
2 =====  
  =====  
3 NION ORCHESTRATION MAP  
4 =====  
  =====  
5 Message: MSG-104  
6 From: System (Meeting Bot)  
7 Project: PRJ-ALPHA  
8  
9 =====  
  =====  
10 L1 PLAN  
11 =====  
  =====  
12 [TASK-001] → L2:TRACKING_EXECUTION  
13 Purpose: Extract action items from message  
14  
15 [TASK-002] → L2:TRACKING_EXECUTION  
16 Purpose: Extract and assess risks  
17  
18 [TASK-003] → L2:TRACKING_EXECUTION  
19 Purpose: Extract issues from message  
20  
21 [TASK-004] → L3:knowledge_retrieval (Cross-Cutting)  
22 Purpose: Retrieve project context and relevant  
  information  
23  
24 [TASK-005] → L2:COMMUNICATION_COLLABORATION  
25 Purpose: Process meeting content and generate minutes  
26  
27 [TASK-006] → L2:COMMUNICATION_COLLABORATION  
28 Purpose: Generate meeting summary report  
29 Depends On: TASK-001, TASK-002, TASK-003, TASK-004  
30  
31 =====  
  =====  
32 L2/L3 EXECUTION  
33 =====
```

```
33 =====
34
35 [TASK-001] L2:TRACKING_EXECUTION
36   ↳ [TASK-001-A] L3:action_item_extraction
37     Status: COMPLETED
38     Output:
39       • AI-001: "Unblock API integration issue"
40     Owner: ? | Due: URGENT | Flags: [MISSING_OWNER]
41   ↳ [TASK-001-B] L3:action_item_validation
42     Status: COMPLETED
43     Output:
44       • Validation Summary:
45         • • All action items have been checked for
        required fields
46         • • Missing owners and due dates flagged where
        applicable
47   ↳ [TASK-001-C] L3:action_item_tracking
48     Status: COMPLETED
49     Output:
50       • Action Item Tracking:
51         • • New action items logged into tracking system
52         • • Initial status set to OPEN
53
54 [TASK-002] L2:TRACKING_EXECUTION
55   ↳ [TASK-002-A] L3:risk_extraction
56     Status: COMPLETED
57     Output:
58       • RISK-001: "Development blockers affecting
        delivery"
59     Likelihood: HIGH | Impact: CRITICAL
60       • RISK-002: "Quality issues in production path"
61     Likelihood: HIGH | Impact: HIGH
62   ↳ [TASK-002-B] L3:risk_tracking
63     Status: COMPLETED
64     Output:
65       • Risk Tracking:
66         • • Identified risks logged with likelihood and
        impact
67         • • Risk snapshot updated for project
68
69 [TASK-003] L2:TRACKING_EXECUTION
```

```
70 └→ [TASK-003-A] L3:issue_extraction
71   Status: COMPLETED
72   Output:
73     • ISSUE-001: "API integration blocked - staging
    environment down"
74   Severity: HIGH | Status: OPEN
75     • ISSUE-002: "3 critical bugs in payment flow"
76   Severity: CRITICAL | Status: OPEN
77 └→ [TASK-003-B] L3:issue_tracking
78   Status: COMPLETED
79   Output:
80     • Issue Tracking:
81       • Detected issues logged with severity and
    status
82       • Issue snapshot updated for project
83
84 [TASK-004] L3:knowledge_retrieval (Cross-Cutting)
85 Status: COMPLETED
86 Output:
87 • Project: PRJ-ALPHA
88 • Current Release Date: Dec 15
89 • Days Remaining: 20
90 • Code Freeze: Dec 10
91 • Current Progress: 70%
92 • Team Capacity: 85% utilized
93 • Engineering Manager: Alex Kim
94 • Tech Lead: David Park
95
96 [TASK-005] L2:COMMUNICATION_COLLABORATION
97 └→ [TASK-005-A] L3:meeting_attendance
98   Status: COMPLETED
99   Output:
100     • Meeting summary generated:
101       • 4 speakers identified
102       • 3 action items extracted
103       • 2 blockers identified
104       • 1 deliverable committed
105
106 [TASK-006] L2:COMMUNICATION_COLLABORATION
107 └→ [TASK-006-A] L3:report_generation
108   Status: COMPLETED
```

```
109      Output:  
110          • Meeting Report Generated:  
111              • • Attendees: 4  
112                  • • Key Discussion Points: Integration blockers  
113                      , QA findings, design updates  
114              • • Action Items: 3 assigned  
115                  • • Next Steps: Unblock staging, fix critical  
116                      bugs, review mockups  
117  
118 =====  
119  
117  
118 Process finished with exit code 0  
119
```

Test Case 5:

```
sample_message = {  
    "message_id": "MSG-105",  
    "source": "email",  
    "sender": {  
        "name": "Lisa Wong",  
        "role": "Customer Success Manager"  
    },  
    "content": "The client is asking why feature X promised for Q3 is still not delivered. They're threatening to escalate to legal. What happened?",  
    "project": "PRJ-DELTA"  
}
```

```
1 C:\Users\adity\PycharmProjects\aiNions_test\.venv\  
  Scripts\python.exe C:\Users\adity\PycharmProjects\  
  aiNions_test\main.py  
2 =====  
  =====  
3 NION ORCHESTRATION MAP  
4 =====  
  =====  
5 Message: MSG-105  
6 From: Lisa Wong (Customer Success Manager)  
7 Project: PRJ-DELTA  
8  
9 =====  
  =====  
10 L1 PLAN  
11 =====  
  =====  
12 [TASK-001] → L2:TRACKING_EXECUTION  
13 Purpose: Extract and assess risks  
14  
15 [TASK-002] → L3:knowledge_retrieval (Cross-Cutting)  
16 Purpose: Retrieve project context and relevant  
  information  
17  
18 [TASK-003] → L2:COMMUNICATION_COLLABORATION  
19 Purpose: Formulate response to query  
20 Depends On: TASK-001, TASK-002  
21  
22 [TASK-004] → L3:evaluation (Cross-Cutting)  
23 Purpose: Evaluate response before delivery  
24 Depends On: TASK-003  
25  
26 [TASK-005] → L2:COMMUNICATION_COLLABORATION  
27 Purpose: Send response to sender  
28 Depends On: TASK-004  
29  
30 =====  
  =====  
31 L2/L3 EXECUTION  
32 =====  
  =====
```

```
33
34 [TASK-001] L2:TRACKING_EXECUTION
35   ↳ [TASK-001-A] L3:risk_extraction
36     Status: COMPLETED
37     Output:
38       • RISK-001: "Client escalation and contract risk"
39     Likelihood: HIGH | Impact: CRITICAL
40   ↳ [TASK-001-B] L3:risk_tracking
41     Status: COMPLETED
42     Output:
43       • Risk Tracking:
44         • Identified risks logged with likelihood and
        impact
45         • Risk snapshot updated for project
46
47 [TASK-002] L3:knowledge_retrieval (Cross-Cutting)
48 Status: COMPLETED
49 Output:
50 • Project: PRJ-DELTA
51 • Current Release Date: Dec 15
52 • Days Remaining: 20
53 • Code Freeze: Dec 10
54 • Current Progress: 70%
55 • Team Capacity: 85% utilized
56 • Engineering Manager: Alex Kim
57 • Tech Lead: David Park
58
59 [TASK-003] L2:COMMUNICATION_COLLABORATION
60   ↳ [TASK-003-A] L3:qna
61     Status: COMPLETED
62     Output:
63       • Response: "I've received your message regarding
        PRJ-DELTA.
64
65 WHAT I'VE LOGGED:
66 • Your request has been tracked
67 • Initial context gathered
68
69 WHAT I NEED:
70 • More specific information to provide accurate
  response
```

```
71 • Clarification on priority and timeline
72
73 Please provide additional details so I can assist
effectively."
74
75 [TASK-004] L3:evaluation (Cross-Cutting)
76 Status: COMPLETED
77 Output:
78 • Relevance: PASS
79 • Accuracy: PASS
80 • Tone: PASS
81 • Gaps Acknowledged: PASS
82 • Result: APPROVED
83
84 [TASK-005] L2:COMMUNICATION_COLLABORATION
85 → [TASK-005-A] L3:message_delivery
86     Status: COMPLETED
87     Output:
88     • Channel: email
89     • Recipient: Lisa Wong
90     • Delivery Status: SENT
91
92 =====
93
94 Process finished with exit code 0
95
```

Test Case 6:

```
sample_message = {  
    "message_id": "MSG-106",  
    "source": "slack",  
    "sender": {  
        "name": "Random User",  
        "role": "Unknown"  
    },  
    "content": "We need to speed things up",  
    "project": None  
}
```

```
1 C:\Users\adity\PycharmProjects\aiNions_test\.venv\  
  Scripts\python.exe C:\Users\adity\PycharmProjects\  
  aiNions_test\main.py  
2 =====  
  =====  
3 NION ORCHESTRATION MAP  
4 =====  
  =====  
5 Message: MSG-106  
6 From: Random User (Unknown)  
7 Project: None  
8  
9 =====  
  =====  
10 L1 PLAN  
11 =====  
  =====  
12 [TASK-001] → L2:COMMUNICATION_COLLABORATION  
13 Purpose: Handle ambiguous request  
14  
15 [TASK-002] → L3:evaluation (Cross-Cutting)  
16 Purpose: Evaluate response before delivery  
17 Depends On: TASK-001  
18  
19 [TASK-003] → L2:COMMUNICATION_COLLABORATION  
20 Purpose: Send response to sender  
21 Depends On: TASK-002  
22  
23 =====  
  =====  
24 L2/L3 EXECUTION  
25 =====  
  =====  
26  
27 [TASK-001] L2:COMMUNICATION_COLLABORATION  
28   → [TASK-001-A] L3:qna  
29     Status: COMPLETED  
30     Output:  
31       • Response: "I received your message, but need  
         clarification:  
32
```

```
33 MISSING INFORMATION:  
34 • Specific project context (no project specified)  
35 • Clear action or question  
36 • Timeline or priority  
37  
38 WHAT I CAN DO:  
39 • Track this as a general inquiry  
40 • Route to appropriate team once clarified  
41  
42 Please provide:  
43 1. Which project this relates to  
44 2. Specific action needed or question  
45 3. Any relevant timeline  
46  
47 This will help me assist you effectively."  
48  
49 [TASK-002] L3:evaluation (Cross-Cutting)  
50 Status: COMPLETED  
51 Output:  
52 • Relevance: PASS  
53 • Accuracy: PASS  
54 • Tone: PASS  
55 • Gaps Acknowledged: PASS  
56 • Result: APPROVED  
57  
58 [TASK-003] L2:COMMUNICATION_COLLABORATION  
59 → [TASK-003-A] L3:message_delivery  
60     Status: COMPLETED  
61     Output:  
62     • Channel: slack  
63     • Recipient: Random User  
64     • Delivery Status: SENT  
65  
66 =====  
67  
68 Process finished with exit code 0  
69
```