Below is the instantiated security case for the Instant Messaging (IM) software from the given assurance case pattern in a hierarchical tree format using dashes (-) to denote different levels.

### Hierarchical Tree Format:

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G1: Instant Messaging (IM) software is acceptably secure in the system

- C1: Definition and description of Instant Messaging (IM) software

- C2: Definition and description of the system

- C3: Definition of acceptably secure

S1: Argument of that software assets are under protection

- J1: Protection of software assets supports that software is acceptably secure

G2: All identified software critical assets are protected

- S2: Respective arguments of software critical assets

- C4: List of Instant Messaging (IM) software critical assets

- J2: Relationship between assets is clear and can be argued separately

G3: Registration information is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

G4: Registration information which belongs to Data Storage is protected

G3: Registration process is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

G4: Registration process which belongs to Process is protected

G3: User account information is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

G4: User account information which belongs to Data Storage is protected

G3: Authentication information is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

G4: Authentication information which belongs to Data Storage is protected

G3: Login process is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

G4: Login process which belongs to Process is protected

G3: Chat logs are protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

G4: Chat logs which belongs to Data Exchange is protected

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### Detailed Breakdown:

1. \*\*G1: IM software is acceptably secure in the system\*\*

- \*\*C1:\*\* Definition and description of IM software

- \*\*C2:\*\* Definition and description of the system

- \*\*C3:\*\* Definition of acceptably secure

- \*\*S1:\*\* Argument of that software assets are under protection

- \*\*J1:\*\* Protection of software assets supports that software is acceptably secure

- \*\*G2:\*\* All identified software critical assets are protected

- \*\*S2:\*\* Respective arguments of software critical assets

- \*\*C4:\*\* List of IM software critical assets

- \*\*J2:\*\* Relationship between assets is clear and can be argued separately

- \*\*G3:\*\* Registration information is protected

- \*\*S3:\*\* Argument of the type which the software critical asset belongs to

- \*\*C5:\*\* List of software critical asset types in PEDD

- \*\*J3:\*\* Types of software assets are according to PEDD

- \*\*G4:\*\* Registration information which belongs to Data Storage is protected

- \*\*G3:\*\* Registration process is protected

- \*\*S3:\*\* Argument of the type which the software critical asset belongs to

- \*\*C5:\*\* List of software critical asset types in PEDD

- \*\*J3:\*\* Types of software assets are according to PEDD

- \*\*G4:\*\* Registration process which belongs to Process is protected

- \*\*G3:\*\* User account information is protected

- \*\*S3:\*\* Argument of the type which the software critical asset belongs to

- \*\*C5:\*\* List of software critical asset types in PEDD

- \*\*J3:\*\* Types of software assets are according to PEDD

- \*\*G4:\*\* User account information which belongs to Data Storage is protected

- \*\*G3:\*\* Authentication information is protected

- \*\*S3:\*\* Argument of the type which the software critical asset belongs to

- \*\*C5:\*\* List of software critical asset types in PEDD

- \*\*J3:\*\* Types of software assets are according to PEDD

- \*\*G4:\*\* Authentication information which belongs to Data Storage is protected

- \*\*G3:\*\* Login process is protected

- \*\*S3:\*\* Argument of the type which the software critical asset belongs to

- \*\*C5:\*\* List of software critical asset types in PEDD

- \*\*J3:\*\* Types of software assets are according to PEDD

- \*\*G4:\*\* Login process which belongs to Process is protected

- \*\*G3:\*\* Chat logs are protected

- \*\*S3:\*\* Argument of the type which the software critical asset belongs to

- \*\*C5:\*\* List of software critical asset types in PEDD

- \*\*J3:\*\* Types of software assets are according to PEDD

- \*\*G4:\*\* Chat logs which belongs to Data Exchange is protected